

# THE IRON AGE

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## Organizing Safety Committees

Satisfactory Methods Followed in  
the Case of One Company—Safety  
Wall for Iron and Scrap Yard

— BY H. A. RUSSELL —

When we compare the machinery catalogs of to-day with those of only a few years ago, we find the emphasis placed not only on the improvements in the mechanism and on the greater amount of output obtainable, but also on the safety features. In the older catalogs, gears were shown unguarded and here and there a projecting set screw could be seen. To-day the gears are shown guarded, and if it is necessary to reveal the plan of the gearing, the guards are placed near the machine and included in the photograph. Projecting set screws are no longer used and in the printed text will be men-

side to grind oddly shaped castings, as soon as the operation is completed the hood is replaced in its proper position. Formerly it might have remained in the incorrect position indefinitely. Again we find ladders with non-slipping shoes for concrete floors or with steel points for wooden floors. We find that the workers on a first floor are protected from having castings or similar articles fall on them by a pipe railing, covered with wire netting, and placed along the edges of the galleries overhead. In many shops a large gong is placed on the overhead crane and when a load is being carried over the heads



A Concrete Wall of a Special Shape, Capped with Metal to Minimize Breakage of the Wall, Serves as a Safeguard to Passing Workmen Propelling Wheelbarrows

tioned the various features that have been planned to protect the operator and others who may come in close proximity to the equipment. Safety guards are not the results of new ideas so much as they are the logical outcome of these ideas. In times past we thought they were good things and the only difference is that now we know they are.

If we go into the mills and factories we find that the safety rules are more rigidly enforced. If, as will happen in exceptional instances, a guard-hood over an emery wheel is swung backward or to one

of the workers, the gong sounds its warning. Dark passageways and corners are no longer allowed. Railings are placed at all doors opening on railroad tracks. Where formerly the safety methods were haphazard, they are now the results of careful planning and thought.

There are several ways of building up competent safety departments. One is to appoint several of the office men and one or more of the factory force to give the matter attention from time to time, but another and a better way is to include the workmen,

or at least a few of them from each department. By organizing a head committee of, say three people, representing both the office and the factory and by having sub-committees in each department, consisting of either the foreman or assistant foreman and two or more of the workmen, and by still further having a definite mode of procedure, such as a specified time to make inspections and hold meetings and provision for making out a written report giving the recommendations of the sub-committee, there will be given an impetus to safety regulations and improvements that will more than recompense the value of the time spent by those participating.

A plan that has given splendid results was based on this method. Eighteen different departments were included and the meetings are called for different days; as the first Tuesday, Wednesday and Thursday in each month. All of the inspections could be arranged for the same day, but usually there will be some one in the office or factory whom it is thought best to have at as many meetings as possible. In the event of any one of the inspection

mittee place their initials. The next line will contain the initials of the members of the head committee, who have approved the recommendation. The filled-in form is then sent to the foreman of the department whose duty it is to see that the change is made promptly. When the work is completed the foreman fills in the date and adds his initials. The form is then returned to the office and filed for future reference.

The accompanying reproduction of a photograph shows a concrete wall placed along the foundry switch to keep the pig and scrap iron from rolling on the track. Sufficient width has been allowed so that a man with a wheelbarrow can pass up and down without his hands coming in contact with either the wall or the car. On the top of the wall a piece of No. 10 gage steel has been placed and held in place by bolts fastened in the concrete. This prevents the top of the wall being chipped when either pig iron or scrap is being unloaded. Half way down the wall will be noticed a 4-ft. opening; this permits the entrance of the wheelbarrow and does away with the necessity of going down to the extreme end of the wall in order to load up the material.

SAFETY COMMITTEE SUGGESTION	
DATE	7/6 1915
SUB-COMMITTEE OF DEPT. 6	SUGGESTS
That a foot board about 12" high be put on each side of the railing at rear steps leading from stock room to first floor. This will prevent anyone slipping and the railing.	
Signed	C. H. B. C.
Approved by Suggestion Committee per	A. L. L.
Above completed	7/6 1915 Signed C. H. B. C.

A Typical Safety Report Blank Which Suggests "That a foot board about 12 in. high be put on each side of the railing at rear steps," etc.

days falling on a holiday, the inspection is postponed to the following day.

On the day previous to the meeting of any sub-committee, the office telephone operator notifies the chairman of the sub-committee interested as follows: "Sub-committee on safety, department No. 6, will meet to-morrow at 1 p. m." This gives him plenty of time to notify the other members of the sub-committee. Again on the morning of the meeting day, the operator sends out the message changing the word "to-morrow" to "to-day."

At 1 o'clock the members of the sub-committee start on a complete tour of inspection of their department. Elevators and machinery are carefully inspected, also stairways and railing guards along the different galleries. Inspection of fire prevention equipment is under the charge of the factory fire department. Electrical equipment is in charge of the chief electrician. Particular attention is given by the sub-committee to all new machinery that may have been installed since the first inspection, as well as to observe that the recommendations previously made have been properly attended to.

The form illustrated is used for the report. The report is sent in to the head committee even though there are no recommendations to make. It is not necessary to wait until the meeting day to make recommendations; these can, and occasionally do, come in between meetings. As some departments were considered too large for one sub-committee, there are two or more in several departments. Near the bottom of the form, on the first line starting with the word "signed," the members of the sub-com-

## Standard Screw Company's Report

The fifteenth annual report of the Standard Screw Company, 81 East Madison Street, Chicago, covering the year ended March 31, 1915, shows a deficit of \$47,494, after the payment of dividends of 6 per cent on the A preferred stock, 5 1/4 on the B preferred and 3 1/2 on the common. The income account for the year compares with the two preceding years as follows:

	1915	1914	1913
Net profits, after ample charges for repairs, renewals, administration expenses, etc.	\$277,336	\$460,464	\$373,657
Interest	33,871	52,243	46,055
Balance	193,465	408,221	327,602
Dividends	240,959	232,500	195,000
Deficit	\$47,494	*\$175,721	*\$132,602
*Surplus.			

The balance sheet, as of March 31, 1915, compares as follows:

Assets		
	1915	1914
Plant and equipment	\$5,356,655	\$5,268,042
Materials and supplies	1,479,934	1,015,552
Accounts and notes receivable	598,721	468,301
Prepaid expenses	60,742	23,445
Cash	816,736	134,373
Total	\$8,312,788	\$6,909,713
Liabilities		
	1915	1914
Preferred stock A	\$1,071,100	\$2,000,000
Preferred stock B	1,528,900	5,000,000
Common stock	2,500,000	2,500,000
Debtenture bonds	360,000	420,000
Notes payable	889,000	716,000
Accounts payable	212,481	162,413
Reserve for incomplete contracts	687,500	
Surplus	1,063,807	1,111,300
Total	\$8,312,788	\$6,909,713

President W. B. Pearson, in his accompanying remarks, says: "Toward the end of the year there was a decided improvement in our business, but it did not come soon enough to much improve the present statement; besides this we were at considerable expense in preparing to handle certain contracts which are now in hand. Returns from these contracts, which are of considerable magnitude and which extend over a considerable period, may now be expected, and your directors have no hesitancy in predicting very satisfactory returns for the coming year."

The company's subsidiaries are the Chicago Screw Company, Illinois Screw Company, Western Automatic Machine Screw Company, Worcester Machine Screw Company, Hartford Machine Screw Company, Walker & Ehrman Mfg. Company, Pearson Machine Company and Detroit Screw Works.

# New Iron Mill Equipped to Assure Low Costs

The St. Louis Screw Company Follows Most Recent Mill Practices in Building Its Mill—Powdered Coal and Clean Scrap Used Exclusively

BY O. J. ABELL

Prophecy of decadence in the bar-iron industry has been made with greater freedom than accuracy, and when the operation of the Tudor mill of the Republic Iron & Steel Company at St. Louis was discontinued in June, 1912, after forty years of activity, opinion was not lacking that another page had been added to the record of evidence. The completion of the new mill of the St. Louis Screw Company at St. Louis is primarily conspicuous when

for cinder disposal and a general type of mill building construction which conduces to exceptional light and ventilation, as may be seen from the accompanying illustrations.

The plant, as at present equipped and operated, is part of a complete unit which, as indicated in the general ground plan Fig. 1, includes a 20-in. puddle mill, an 18-in. bar mill, a 14-in. roughing and 9-in. finishing mill. The product of these mills will in-

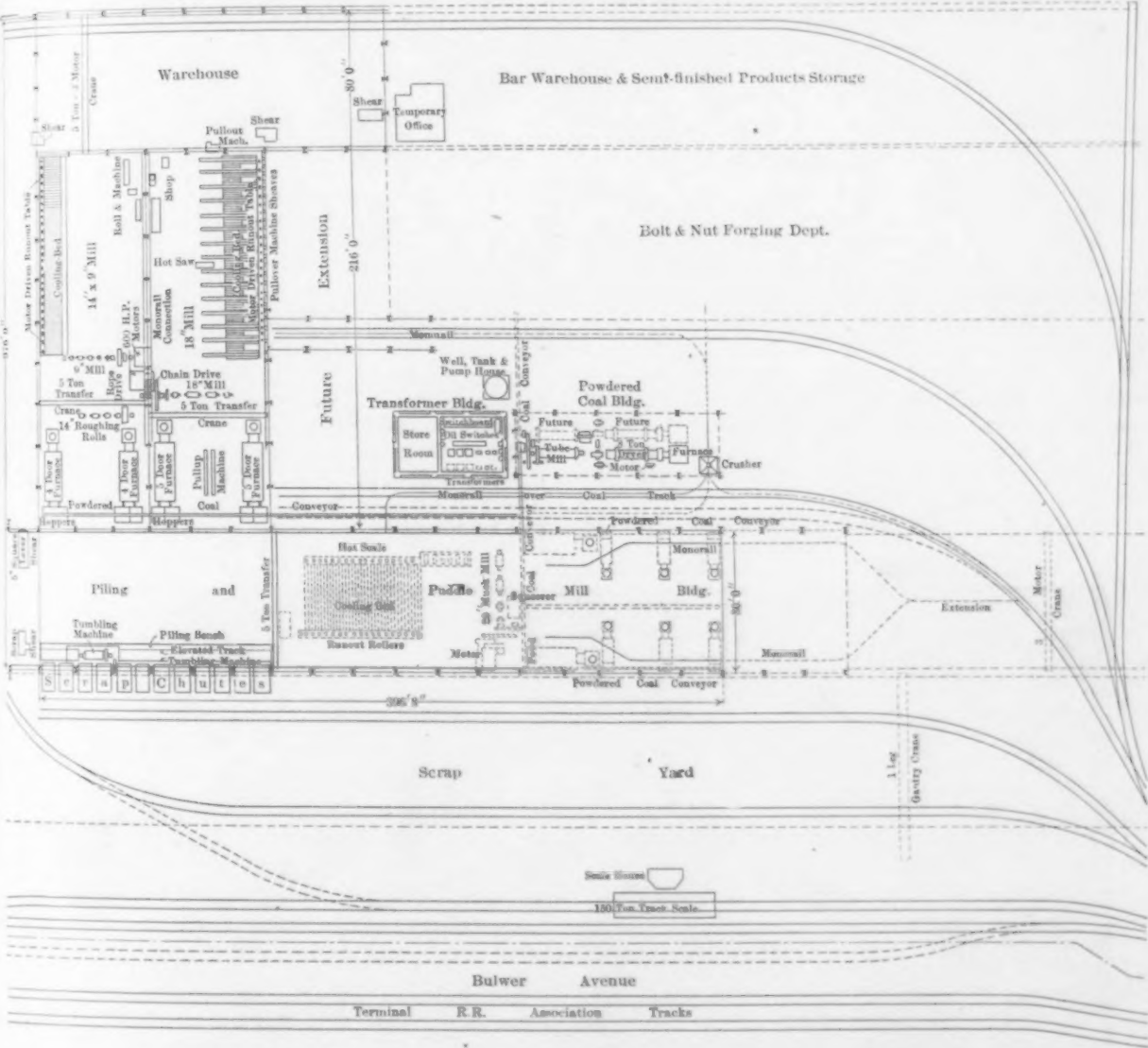


Fig. 1—General Plan of Present and Part of the Future Buildings of the St. Louis Screw Company

viewed in that connection. In addition this new mill commands attention because of a number of features which, as an indication of progressive development in practice, rank with contemporary improvements in steel mill equipment. These features include the use of powdered coal as a fuel for the heating furnaces, the installation of an overhead crane and mono-rail service available to the entire mill, a unique installation for the cleaning of all scrap, electric motive power throughout, with a silent chain drive on the 18-in. mill, a novel device

clude bars for the market and raw material for the screw and bolt manufacturing operations which have been conducted by this company for many years. The ground plan shows the proposed location of a bolt, nut and screw works adjoining the mill, but as yet this part of the construction has not been undertaken, the company still occupying its old plant a short distance from the new works. The erection of the new screw works on the mill site will follow immediately upon the disposal of the old plant. The puddle or busheling mill and fur-





Fig. 2—View in the Powdered Coal Building Showing the Monorail and Bucket Equipment for Unloading Coal from Cars into the Hopper for Elevation into the Steel Bin at the Right

naces, likewise, are not yet set up, although the mill building is erected and some of the equipment is on the ground, but the layout indicates the harmonious arrangement in which the already completed mills can be hooked up with the portions of the plant yet to be built.

The producing capacity for the present mills is estimated to be 2500 tons per month for the 18-in. mill, covering a range of from 1-in. to 3-in. rounds and squares, and flats up to 8 in. wide, and for the 9-in. mill about 2000 tons per month, with a range of  $\frac{3}{8}$ -in. to  $1\frac{1}{4}$ -in. rounds and squares and flats from  $\frac{5}{8}$  in. to 4 in. wide.

The choice of powdered coal as a fuel was made

in the expectation of greater operating economies as compared with the other types of fuel in more common use. The location of the plant at St. Louis was presumed to be as favorable for the undertaking as could be desired, by reason of the proximity of the Illinois coal fields and cheap coal. Operations in the beginning were conducted using 1-in. and  $1\frac{3}{4}$ -in. Franklin County, Ill., nut coal, which, so far as the record shows, constitutes the first time Illinois coal has been used in this way.

It was subsequently found that slack coal could be used with equally good results. Since the beginning of operations the heats obtained in the furnaces with the powdered fuel have been exceptionally satisfactory, and the advantages of operating without the necessity of cooling down the furnaces to clean grates have been marked. The first cost of the installation is stated to be not unduly in excess of the first cost of the necessary equipment for the use of producer gas, and in the light of anticipated economies the brief experience thus far is held to amply justify expectations and the greater first cost. Figures as to the exact cost of heating a ton of metal are not yet available.

The powdered coal plant, with the exception of a Williams pulverizing mill, was built and installed by the Power & Mining Machinery Company, Cudahy, Wis. Two views in the pulverizing building are shown in Figs. 2 and 3 and the general elevation and plan is presented in the line drawing, Fig. 6.

Outlined briefly, the pulverizing process begins with the unloading of the coal from cars, alongside of the building, by means of an overhead trolley and a  $1\frac{1}{2}$ -yd., electrically operated, Hayward grab bucket which discharges into a 5-ton hopper, as shown in Fig. 2. From this hopper the coal is fed through a reciprocating feeder into a spiked roll crusher mounted in a sub-floor pit and discharging directly into the boot of a 40-ton bucket elevator. The roll crusher breaks up the coal to a uniform size of about  $\frac{3}{4}$ -in. cubes. This coal is discharged

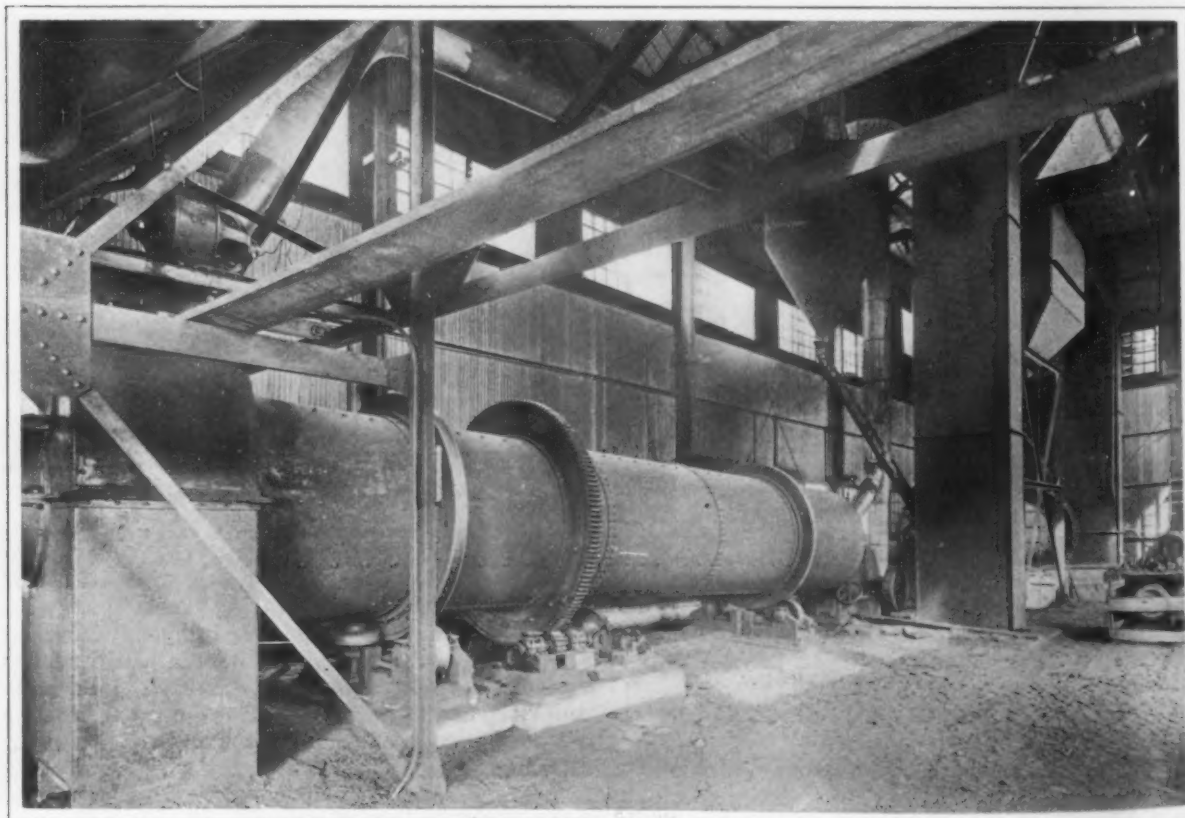


Fig. 3—View in the Powdered Coal Building Showing the Rotary Dryer in the Foreground and the Tube Mill Beyond. The Williams Mill is Placed at the Far End of the Dryer



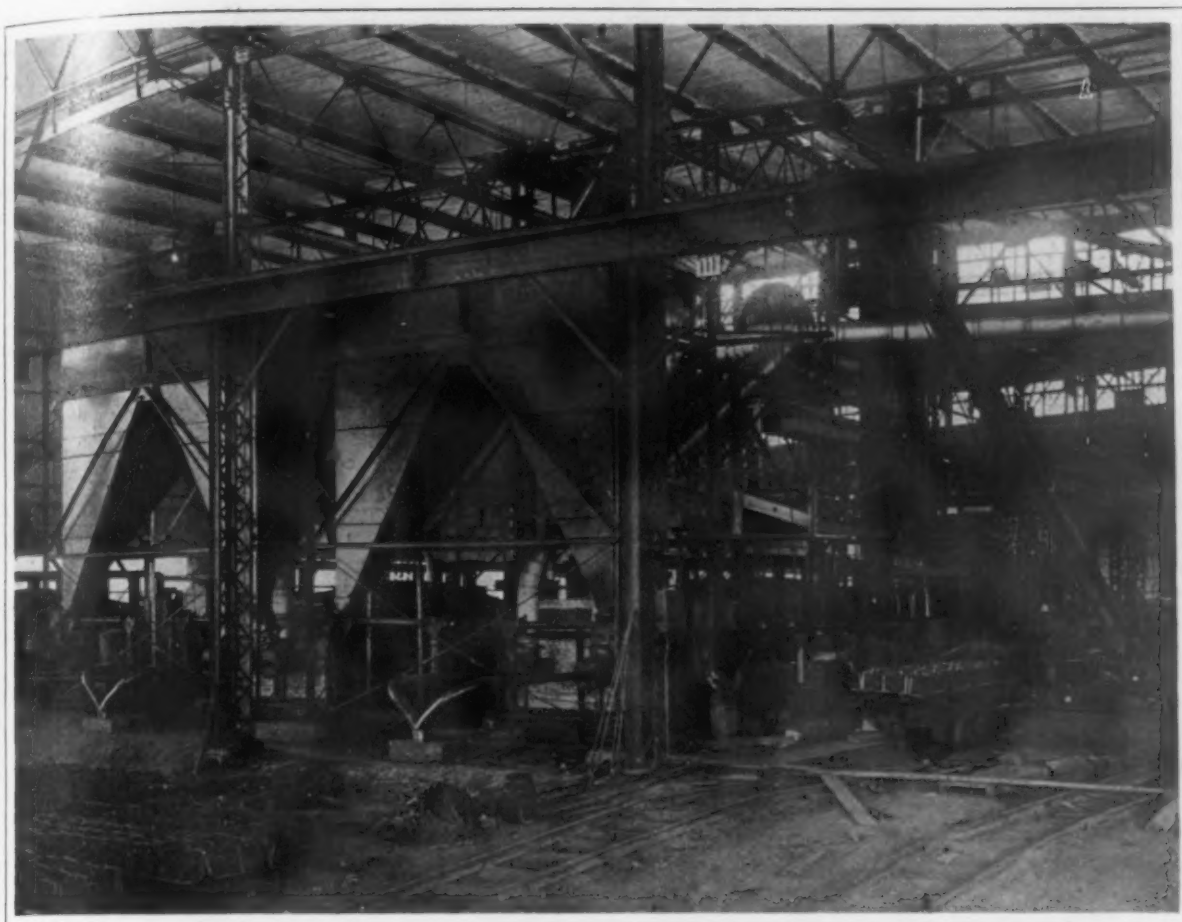


Fig. 4—View of the Heating Furnaces from the Piling Bench. One Furnace at the Right is Not Included. The Powdered Coal Storage Hoppers and the Piping for the Burners are Shown as Well as the Method of Handling Scrap Piles and Faggots by Push Buggies and Overhead Trolley Hoist

from the elevator to a horizontal belt conveyor, which in turn drops the coal through a hopper, after it has passed over a magnetic separator, to a 12-in. screw conveyor which distributes the coal in an 80-ton overhead, steel, storage bin for subsequent feeding to the dryer as required. This storage capacity gives flexibility to the pulverizing plant as regards coal supply, the capacity of the present unit being limited by the dryer, which will handle coal at the rate of 8 tons per hr.

In the dryer the moisture of the coal is reduced below 1 per cent. The general character of this dryer is apparent from the illustrations. At the charging end a combustion chamber, shown in Fig. 2, is arranged both for hand firing, as at present, and for the use of waste heat from one of the puddling furnaces, subsequently to be installed. The heating gases from the combustion chamber are carried through a brick-lined, steel flue into the dryer, an exhaust fan affording the necessary draft for the distribution of heat and the discharge of gases at the far end, through a steel pipe to a cyclone separator. The cyclone separator serves to hold the fine particles of coal which are carried suspended in the heated gases from the dryer so that all but a negligible residue is reclaimed, to be piped to the dried coal elevator.

The dry coal is discharged from the dryer into a No. 3 Williams pulverizing mill, direct driven from a 50-hp. motor which reduces about 50 per cent of the coal to a fineness sufficient to pass through a 100-mesh screen. From this mill, coal is discharged into a sealed, bucket elevator of 20-tons per hr. capacity. At the head of the elevator a mechanically agitated 100-mesh screen allows 95 per cent to pass through and the coarser portion is fed to the tube mill for final pulverizing.

From the tube mill the coal, pulverized to the required fineness, is elevated in a sealed bucket elevator which discharges into a screw conveyor that delivers the coal to a 10-ton automatic Richardson scale, having a gravity discharge into a 6-ton hopper that provides a final storage before distribution of the coal to the furnaces in the mill building. The general sequence of treatment of the coal in the pulverizing building is indicated in Fig. 6.

The coal dust is carried to the mill buildings in a 9-in. dust-tight, screw conveyor to 8-ton elevated steel bins, of which there are two for each furnace, as shown in the general view, Fig. 4. These bins, likewise, are made dust-tight, tarred felt gaskets being used throughout the conveyor and bin construction where necessary. To avoid the possible blocking or stripping of the conveyor when these bins become filled, an overflow is provided in the nature of a steel downspout to a cylindrical tank. An automatic controlling device immediately stops the motor operating the conveyor line when dust begins to discharge into the overflow.

The feeding of coal from the bins through the bottom valves to the burners is subject to a mechanical control consisting of a worm feed which forces the coal through a screen into the burner and is driven by a variable speed motor with a

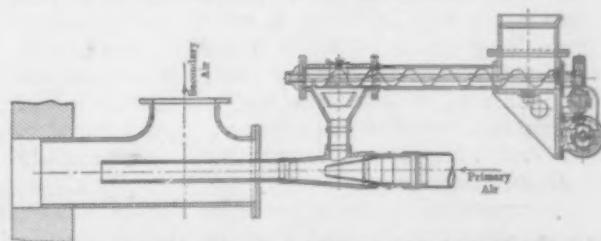


Fig. 5—Cross Section of Powdered Coal Burner

regulating rheostat conveniently located for the furnace operator. The speed with which the worm feed is driven accurately determines the quantity of coal being fed to the burner, and the furnace operator, watching the character of the flame, regulates the combustion as desired. The coal forced through the feed screen drops down over an air nozzle and is picked up by an air jet of just sufficient pressure to carry the coal into the burner. This air jet constitutes the primary air of the burner, and the manner in which it is admitted is indicated in the cross-section of the burner, Fig. 5. The secondary air, which is the air of com-

flue opening, 8 ft. 6 in. wide and 6 ft. 6 in. from the bottom to the back at its highest point, all being inside sizes. Cross-sections of this furnace, showing its lines, are presented in Fig. 8. The cinder from the furnaces discharges, as shown in Fig. 9, directly into a bottom dump bucket about 5 ft. in. diameter and 5 ft. deep, which will hold about 5 tons. A stream of water granulates the cinder as it falls and the crane picks up the bucket when full to be emptied into cars for shipment. The danger of cinder explosions is also minimized.

The provisions for bringing piles to the furnaces for heating are for the most part apparent in the

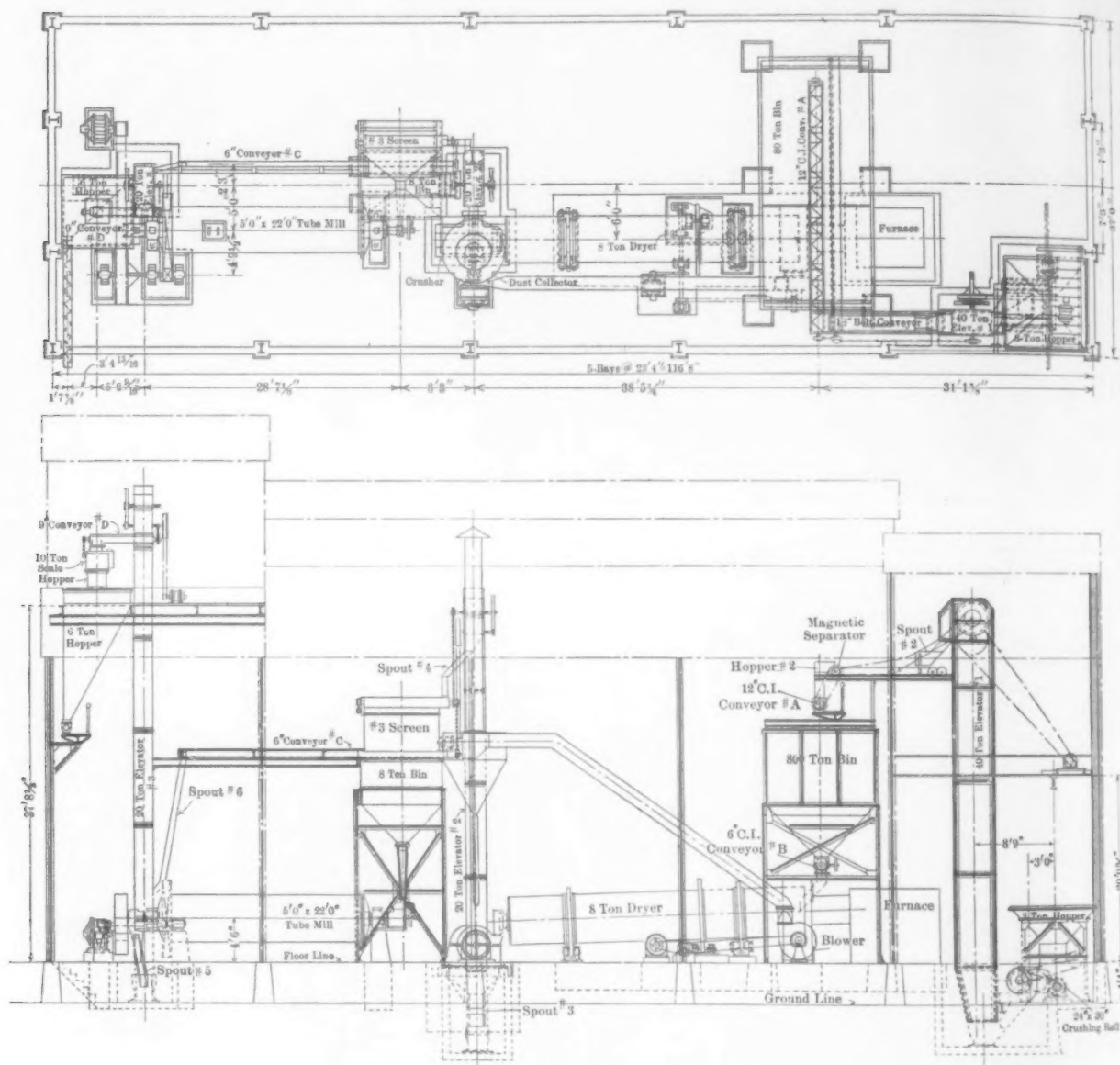


Fig. 6—Elevation and Plan of Coal Pulverizing Plant

bustion, is delivered through a 14-in. pipe, under very low pressure, from an overhead blower. This air is super-heated by contact with the stacks of the furnaces, effected by means of a steel jacket which rises to a height of 30 ft. from the bottom of the stack. The air enters at the bottom of this jacket space and is given a spiral motion about the stack by means of deflector plates. It emerges at the top of the preheating jacket at a temperature increased 175 to 200 deg. above the initial temperature, entering the burner at about 260 deg. Fahr. Each burner has a capacity of approximately 900 lb. of coal per hr.

The five-door heating furnaces for the 18-in. mill are 23 ft. 6 in. long from the bridge to the

accompanying illustrations. Temporarily, the 18-in. mill is making break-down bar, the puddle mill being not yet available. Scrap from the storage yard, or directly from incoming cars, is picked up by the locomotive crane and magnet and is dropped into the twelve chutes arranged above the piling bench.

These chutes slope at an angle of 32 deg. from the horizontal, the tops having an elevation of 29 ft. and the bottoms 19 ft. 2 in. above yard level. The angle of incline was determined experimentally, the object being to have the scrap slide freely yet not too rapidly. The chutes have a storage capacity of about 12 tons each. Immediately below them and mounted on a runway elevated immediately above

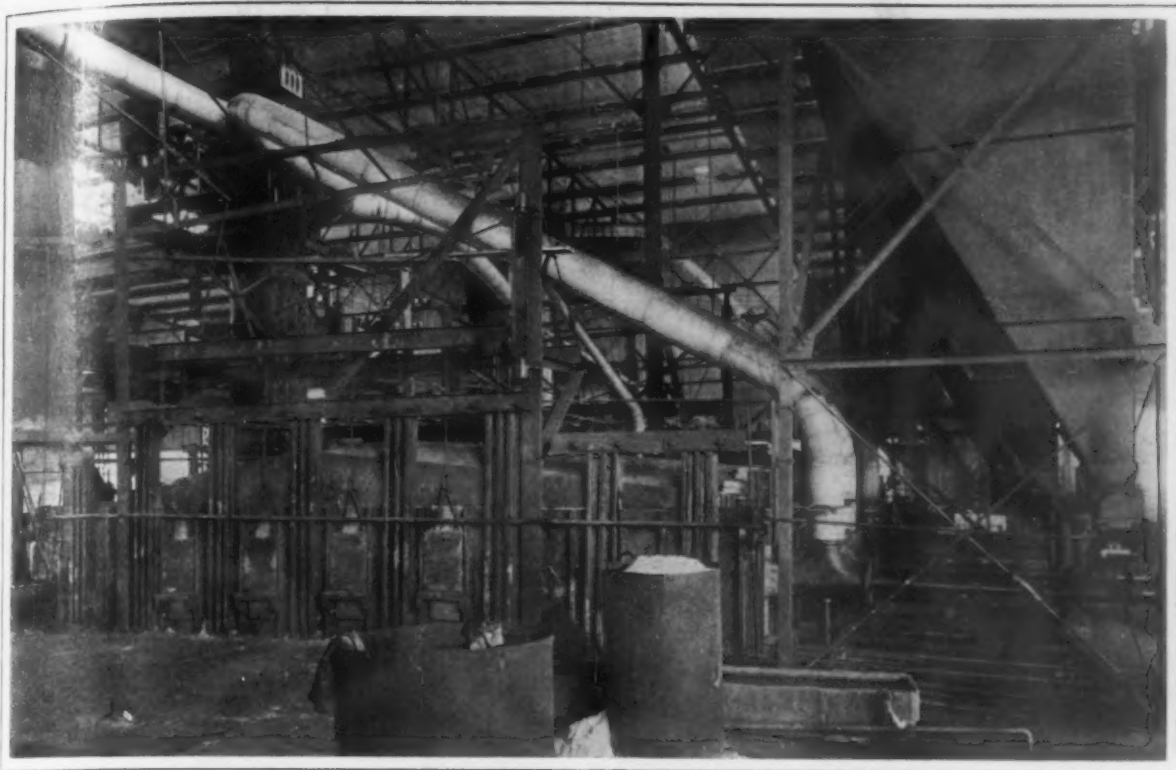


Fig. 7—A Side View of a 4-Door Furnace for the 9-In. Mill Showing Coal Hoppers, Foot Valves, the Burners and Secondary Air Piping from the Overhead Blower

the piling bench, is a 60 x 144-in. traveling tumbling mill, through which all scrap for the mills passes and is cleaned. The tumbling mill is motor driven and is propelled on trucks horizontally at the rate of 40 ft. per min. When lined up with a particular chute the scrap discharges directly into the barrel. The dust collector is mounted on the trucks which carry the mill. This equipment follows a new design and was illustrated in THE IRON AGE of July 1. It was built by the W. W. Sly Mfg. Company, Cleveland, Ohio. The mill has a capacity for

cleaning 30 tons per hr., and by virtue of the arrangement provided, nothing but clean scrap is delivered to the piling bench and no manual handling of the scrap is involved. The piling bench, 140 ft. long and 10 ft. wide, is built of concrete and steel with removable surface plates.

Equipment for preparing the scrap includes portable yard shears and a 100,000-lb. steel frame lever shear with capacity for shearing 5-in. squares. It was built by the Wheeling Mold & Foundry Company. It is drawn by a 100-hp. motor mounted on

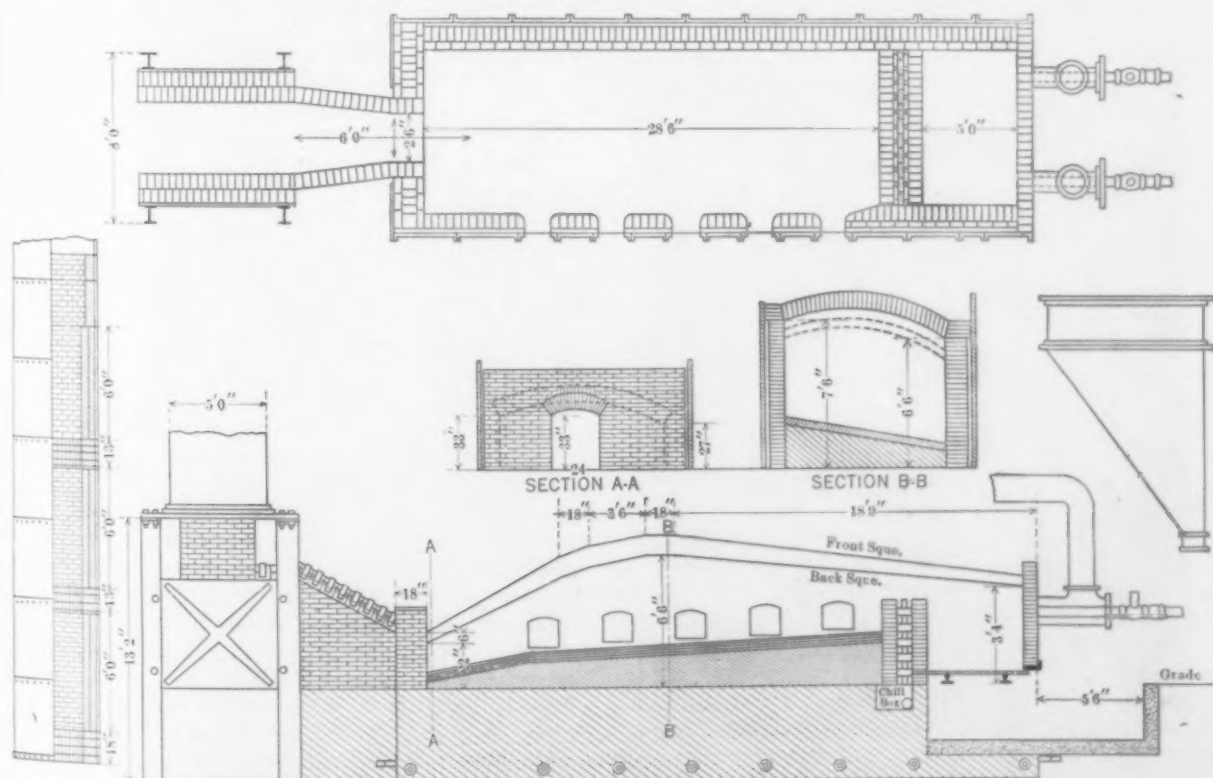


Fig. 8—Sections of 5-Door Heating Furnace



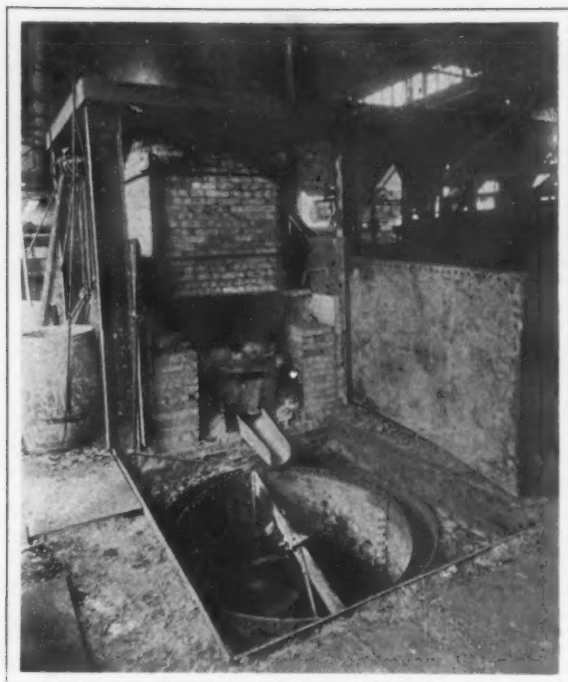


Fig. 9—The Device Shown Granulates the Furnace Clinker and Provides for Its Disposal When the Crane Picks up the Bottom Dump Bucket for Direct Loading into Cars

a sliding base which permits a change of driving pinions to give two cutting speeds, 12 and 20 strokes per min. Protection for the machine in case of overload at the cutting point is provided by mounting the pinion from which the shearing jaw is operated on a sleeve on the main shaft. The sleeve is then bolted to a flange solid with the shaft and the connecting bolts are designed to shear off before other damage can be done.

For the delivery of the break-down piles or fagots from the piling bench to the furnaces, two means of transportation are provided. An overhead crane bridge spans the building and on this a 5-ton Shepard electric trolley-hoist is operated. This trolley, delivering a load of fagots to the furnaces of the 9-in. mill, is shown in Fig. 4. Small buggies



Fig. 10—View of the High Duty Silent Chain Drive for the 18-in. Mill and the Rope Drive for the 9-in. Mill. The Control Pulpit is at the Left

operating on narrow gage tracks which run down from the furnace charging floor to the piling bench are also available as an auxiliary. These also are shown in the illustration.

The 18-in. mill consists of two stands, three high, and one finishing stand, three high. The length of the roughing rolls is 80 in., of the pinions 20 1/4 in., of the strand rolls 56 in., and of the finishing rolls 24 in. The feature of chief interest in connection with the 18-in. mill is the 600-hp. Morse silent chain drive which hooks the mill up directly to the driving motor. It is the largest unit of this kind in service and consists of two strands of 2-in. pitch chain, each 17 in. wide and 152 links long. The chain operates at a rate of 1450 ft. per min., on sprockets of 29 and 79 teeth. The pull is estimated at 13,750 lb., against a breaking strength of 250,000 lb. for the chain, and the drive is guaranteed to stand an overload of 100 per cent with a normal efficiency of 98 per cent. A view of this drive is shown in Fig. 10. The mill has an 18-ft. steel fly-wheel, weighing 66,000 lb.

The cooling beds for both the 18-in. and 9-in. mill are of standard construction, 110 ft. long and 31 ft. wide. The live roll tables, built by the Duncan Foundry & Machine Works, Alton, Ill., are 110 ft. long with rolls spaced at 4 ft. centers. The rolls have roller bearings and a 5-hp. motor suffices for driving. At the warehouse end of the roll tables, and set up at the proper height so that the roll table delivers the bars directly to the shear blades, are motor driven vertical cold shears, furnished by the A. Garrison Foundry & Machine Company. The shear for the 18-in. mill has capacity up to 3 1/2-in. squares and that for the 9-in. mill up to 2 1/2-in. squares.

The 14-in. roughing train consists of two, three high stands with pinions 17 1/2 in. long, roughing rolls 53 1/2 in. long and strand rolls 36 1/2 in. long. The 9-in. mill is made up of two stands, three high, and two stands, two high, with pinions 14 1/2 in. long, the three high rolls 30 in. long and the two-high rolls 12 in. The 9-in. mill has a 10-ft. steel fly-wheel weighing 30,000 lb. and is direct driven by motor. The 14-in. mill is driven from the 9-in. by fifteen 1 1/2-in. rope strands, which is about double the number actually needed. The scale from the mills is sluiced off in concrete troughs to the ends of the mill, where it is collected in bottom dump buckets and removed by crane. The mill housings are of standard type with screw tops and bottoms, the middle roll being stationary. Both these mills and the 18-in. mill and the drives were built by the Wheeling Mold & Foundry Company.

The driving motors for both mills are two-speed, 600-hp. units operating on three-phase, 25-cycle, 2200-volt circuits, and were built by the Allis-Chalmers Mfg. Company. The speeds afforded are 300 and 214 r.p.m., with full power at both speeds. On the 18-in. mill drive the chain gear reduces these speeds for the mill to 110 and 78 1/2 r.p.m. The 9-in. mill is a direct drive from the motor and the 14-in. mill with rope drive runs at 150 and 107 r.p.m. The control for both motors, furnished by the Cutler-Hammer Mfg. Company, is located on control panels assembled on a central pulpit, as shown in the illustrations. An emergency stop button is located at the mill within easy access for the roller.

The 2200-volt current which operates the motors is stepped down from a 13,200-volt primary current which is brought to the plant on the lines of the Union Electric Light & Power Company, distributor for the Mississippi River Power Company's current, generated at Keokuk. For the receiving and transforming of this high tension current, a complete

equipment installed, the transformers being furnished by the Wagner Electric Mfg. Company, St. Louis, and the switchboard by the General Electric Company. The transformer station equipment provides, in addition to the 2300-volt step-down transformers, for a 440-volt current for the small Westinghouse mill motors and a 115-volt lighting circuit. The 220-volt direct current power for crane service is provided for by a 50-kw. General Electric motor generator set.

The puddling mill equipment will include a 20-in. muck bar mill of two stands, three high. The furnaces to be installed will include two pile-on-board, four sand bottom and two cinder bottom. A steel belt conveyor is to be used for carrying the balls from the furnaces to a 60-in. squeezer. The scrap for the furnaces will be loaded in scoops in the yard, carried on the monorail direct to the furnaces and charged without further manual labor.

ing is inclosed with galvanized corrugated sheeting, the siding being brought down to within 9 ft. of the floor level. The building bays are 23 ft. 4 in. between centers of columns. The yard level has been brought to an elevation of  $2\frac{1}{2}$  ft. above that of the surrounding ground. The building elevations place the mill floor 4 ft. above the yard level, the height to the bottom of the monorail beam 22 ft. 9 in., the height of the top crane rail 26 ft., the height to the bottom of the truss chords at the low point 34 ft., and above that a 9-ft. elevation to the roof.

In addition to the bar products which the St. Louis Screw Company is now equipped to supply, the ultimate building of the new bolt and nut forging works will give it increased capacity in the manufacture of its established lines of screws, machine screws, bolts and nuts and screw machine products. The officers of the company are E. J. Miller, president; W. S. Ashton, vice-president;

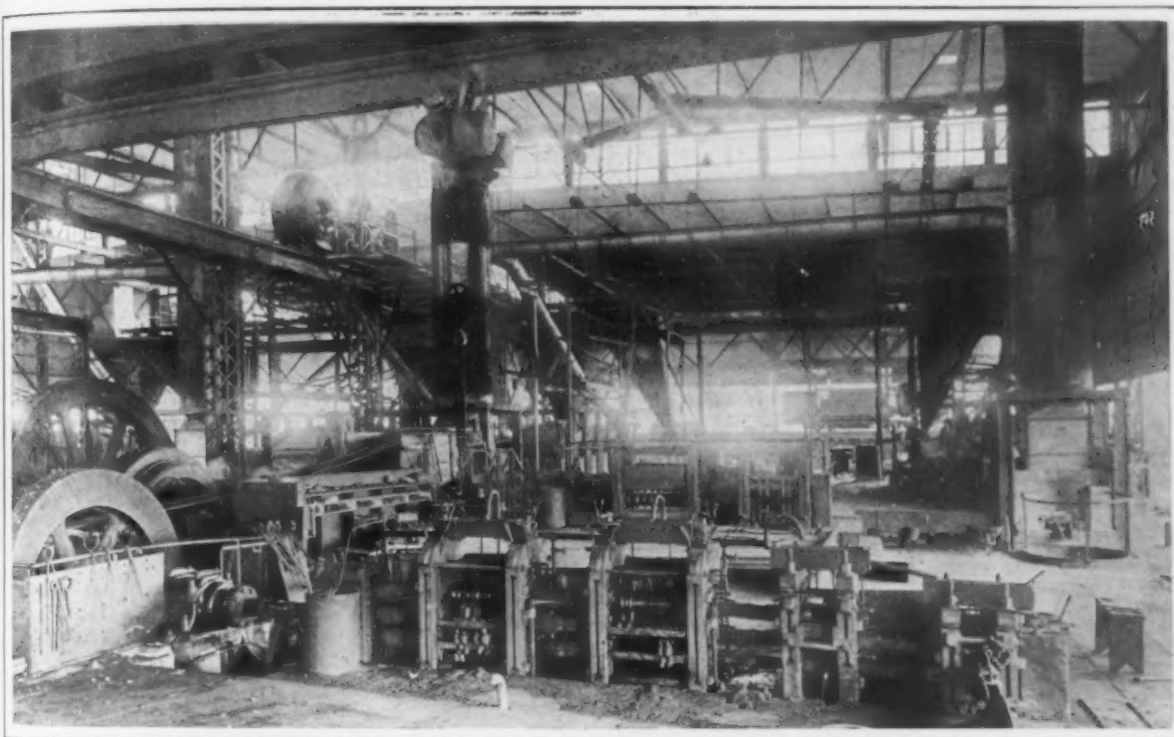


Fig. 11—View of the 9-In. Mill in the Foreground with the 14-In. Roughing Stands Beyond and the Piling Bench in the Background

The facilities for handling materials in and about the plant constitute one of its most advanced features. In the scrap yard a 15-ton Orton & Steinbrenner locomotive crane, equipped with a 52-in. Electric Controller & Mfg. Company magnet, or 2-yd. grab-bucket, is available for general service. For the mill buildings a monorail and traveling bridge crane system has been combined in such a way that the electric traveling hoists operating on the monorail from the yard or pulverizing building, or within the mill buildings, may be transferred to the crane bridges spanning the puddle mill and bar mill buildings. The monorail hoists are 5-ton Shepard, cage-operated lifts. The crane bridge serving the puddle mill has a 77-ft. span and the bridges over the 18-in. and 9-in. mills are each of 67-ft. span. In addition to the 5-ton trolley, a floor control monorail hoist of like capacity is installed for service on the cranes spanning the 9-in. and 18-in. mills. The warehouse is served by a 5-ton 3-motor electric overhead traveling Northern crane.

The mill buildings are of steel skeleton construction, carried on concrete piers and having the depressed bay type of roof construction. The build-

ing is inclosed with galvanized corrugated sheeting, the siding being brought down to within 9 ft. of the floor level. The building bays are 23 ft. 4 in. between centers of columns. The yard level has been brought to an elevation of  $2\frac{1}{2}$  ft. above that of the surrounding ground. The building elevations place the mill floor 4 ft. above the yard level, the height to the bottom of the monorail beam 22 ft. 9 in., the height of the top crane rail 26 ft., the height to the bottom of the truss chords at the low point 34 ft., and above that a 9-ft. elevation to the roof.

#### Benzol Plant at South Bethlehem

The Lehigh Coke Company, which now operates at its South Bethlehem, Pa., plant 214 coke ovens and has 214 additional ovens under construction, has awarded the contract for a plant for crude and finished benzol products to Carl Still, Recklinghausen, Germany. It will be ready for operation in the fall. The Carl Still interests have opened a Pittsburgh office in the Farmers Bank Building, in charge of Arthur Kuhn, who is their representative in this country.

The Globe Automatic Sprinkler Company, Cincinnati, Ohio, will increase its capital stock from \$1,000,000 to \$2,000,000. No extensions to its plant are contemplated, nor will any extra equipment be needed. The company is opening seven new sales offices in different parts of the country, and reports the business outlook very encouraging.



### Additions to Ryerson's Hagar Plant

Joseph T. Ryerson & Son have completed an addition to the recently acquired Hagar plant at St. Louis, which, to a large extent, provides the warehousing facilities for the stock of iron and steel products that was added to the established Hagar line of mill supplies when that business was taken over. The new building and beam yard occupies a site of 82,000 sq. ft., separated from the original Hagar plant only by the tracks of the Terminal, Burlington and Wabash railroads, which provide the shipping facilities for the warehouse. The new building and the adjoining structural yard are of like ground area, 80 x 300 ft. The design of the building is the result of a careful investigation of the requirements for warehousing service and is of steel construction with corrugated sheet covering. In the building, which is traversed by a 10-ton crane, serving the full span, are stored the universal, sheared, tank and flange plates in long lengths and stock sizes. Capacity is provided for carrying a stock of 5000 tons of plates and there is installed a plate shear of a size and capacity adequate to cut plates 96 in. wide and 1 in. thick.

A feature of the structural steel yard, which parallels the plate warehouse, is the Pawling & Harnischfeger, single-leg, gantry crane, having a

### International Engineering Congress

The materials of engineering construction will receive special attention in the proceedings and discussions of the International Engineering Congress to be held in San Francisco, September 20-25. The field will be treated under 18 or more topics, covering timber resources, preservative methods, brick and clay products in general, life of concrete structures, aggregates for concrete, waterproofing, volume changes in concrete, world's supply of iron, life of iron and steel structures, special steels, status of copper and world's supply, alloys, aluminum, testing of metals of full sized members and of structures.

Some 25 papers are expected to be prepared by builders representing five different countries. These with the discussions will be published as volume 5 of the transactions of the congress.

A number of excursions have been provided, including the following: San Francisco high-pressure fire system; the Potrero gas works, and one of the electric stations of the Pacific Gas & Electric Company; the Spring Valley waterworks properties on the east side of San Francisco Bay; the storage reservoirs and pumping stations of the Spring Valley Waterworks on the San Francisco peninsula; the delta lands of the Sacramento and San Joaquin rivers; the Great Western Power Company's hydroelectric development on the Feather River and dredging at Oroville; the Pacific Gas & Electric Company's hydroelectric development at Lake



Storage Building and Beam Yard at the St. Louis Plant of Joseph T. Ryerson & Son. A feature of the latter is a single-leg gantry crane with an 80-ft. span. The crane is built so that it can still be used in the event of the yard being inclosed by another building in which case a runway forming a part of the building structure may be substituted for the outer leg.

span of 80 ft., or the full width of the yard. This crane serves a yard storage capacity of about 6000 tons. The crane is of such construction that it can be operated without interruption in the event of the beam yard being inclosed in a building similar to the one already erected and also, so that for the outer leg of the crane, a permanent runway may be substituted as part of the building structure. Equipment for handling material and cutting to sizes to afford the same facilities in the filling and dispatching of orders as obtain at the Chicago warehouse is installed, including a high-speed friction saw with capacity up to 24-in. beams. The Hagar plant, in fact, with the completion of this addition, has been put upon the same operating basis of service standards as has been worked out at Chicago.

The Milwaukee Separator Company, 265 Sixth Street, Milwaukee, Wis., has filed a voluntary petition in bankruptcy, claiming assets of \$179,408 and liabilities of \$54,243. Principal creditors are foundries. The company manufactures cream separators. Willis Collins is president.

Spaulding and drum power house and the gold mines at Grass Valley and the oil fields at Coalinga. A booklet covering the general program has been issued and a copy may undoubtedly be had on request by addressing W. A. Cattell, secretary International Engineering Congress, 417 Foxcroft building, San Francisco.

The R. K. LeBlond Machine Tool Company, Cincinnati, has taken out a blanket life insurance policy covering all employees with the company one year or more. Each is insured for one year's average wages, or salary, in the event of death by accident or otherwise. It was also arranged that employees who had not been with the company for one year would automatically be insured when that period of employment was reached.

Fred Schelben, proprietor of the Greenville Boiler & Sheet Iron Works, Greenville, Miss., has secured the contract for installing four 72-in. x 18-ft. tubular boilers, to be set with steel casings, and a 72-in. x 120-ft. stack, for the Paepcke-Liecht Lumber Company, at the same place.

The Waterbury Company, manufacturer of cordage, wire rope and music wire, has moved its New York quarters to 63 Park Row.



## Two Die and Shell Hardening Furnaces

Tate, Jones & Co., Inc., Empire Building, Pittsburgh, Pa., has brought out two new types of hardening furnaces. One of these is built with three distinct chambers for hardening dies, while the other has a lead bath and was designed especially for use in connection with the manufacture of shell for the Russian Government.

The die hardening furnace has three chambers, two of which are 18 in. square in plan, while the third is 12 in. wide and 18 in. deep, the height of all three being the same, 10 in. Individual combustion chambers are located underneath the heating chambers at the top, a firebrick slab forming the dividing partition. Each chamber is fired independently by a natural gas or fuel oil burner and the heat from the combustion chamber passes through long narrow slots at the sides of the firebrick slab into the heating chamber, thus giving a furnace of semi-muffle construction. It is thus possible to use two of the chambers for long soaking preheating heats before bringing the work up to the final hardening temperature in the other chamber, or if desired the three chambers can be used independently for entirely different work.

A lever arm fastened to the rear sheave bracket is attached to the lifting links on the door by a sliding arrangement so that the movement of this lever raises or lowers the doors. The doors are counterweighted and the weight drops in the rear of the furnace.

The other furnace is known as a preheated lead bath furnace and was designed for construction of Russian shell. The lead bath is 12 in. wide, 24 in. long and 12 in. deep, and at one end has a pocket to accommodate a pyrometer couple. A distinctive feature of this furnace is the entire separation of the combustion chamber where the oil or gas fuel is burned from one in which the lead bath is located and the heat passes from one chamber to the other through openings, this arrangement being relied upon to distribute the heat evenly over the surface of the bath.

The lead bath proper is covered by a cast-iron plate in which there are eight openings through



A Lead Bath Furnace for Shell Work Equipped with a Pre-heating Chamber

which shells can be inserted in the bath. The shells are placed in the holes with the open end up and a plug placed in the shell, thus forcing it down into the lead bath until the plug strikes the top plate. The amount of the bath in the pot is sufficient to bring the surface of the lead up to the bottom of the plate covering the pot, thus immersing the shell to within about 1 in. of the top. This portion of the shell is heat treated when the shell is nosed after the heat-treating operation.

The preheating chamber at the rear of the furnace provides room for twenty shells. The hot gases from the combustion chamber of the furnace pass through this preheating chamber and heat the shells.

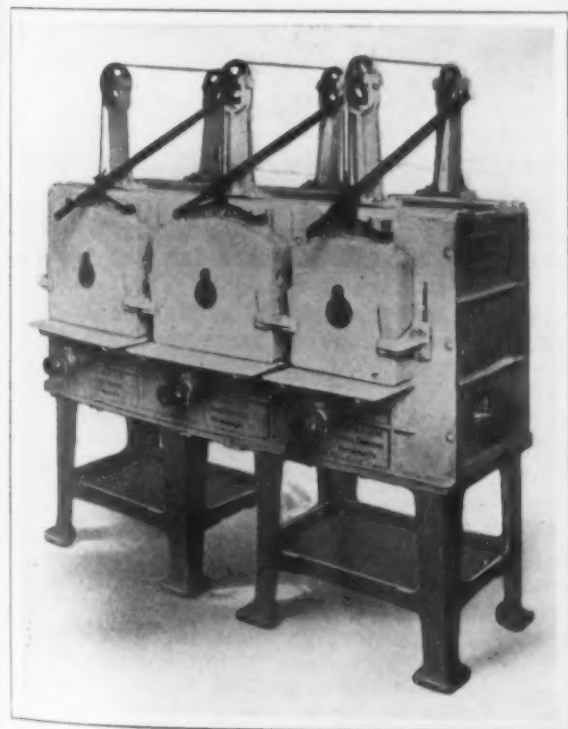
## Germany's Steel Output for March

Germany's steel production for March, according to official data in Stahl und Eisen, was 1,098,273 metric tons, against 1,634,297 tons in March, 1914, and 946,191 tons in February this year. The March production was made up of 567,964 tons of Bessemer ingots, 567,671 tons of open-hearth ingots, 45,278 tons of steel castings, 8105 tons of crucible steel and 9255 tons of electric steel. It is interesting to note that the March production this year exceeded the March production last year of Bessemer steel ingots by about 6000 tons, of basic steel castings by over 7000 tons, of acid steel by about 1200 tons and of electric steel by 1000 tons. The total output for the first quarter of this year was 3,008,254 tons, against 4,746,562 tons to April 1, 1914, a decrease of about 37 per cent.

## Departures of Italians for the War

In view of the published statements concerning the return of Italians and former residents of the Balkan States to their respective countries recently, the facts as to their departures from New York in June are of interest to the iron and steel trades. From the office of the Commissioner of Immigration, New York, we learn that in June about 3600 Italians returned to their native country and 650 Greeks. Very few Bulgarians, Turks or Serbians have departed from the United States in recent weeks.

The summer school of management which Frank B. Gilbreth, 77 Brown Street, Providence, R. I., held at Providence the last two summers, is to be repeated this year for three weeks, beginning August 2. The course is open to professors of engineering, economics, psychology, business administration and subjects allied to management and also to doctors and superintendents in active charge of hospital administration.



A Three-Chamber Die Hardening Furnace in Which All Chambers Are Independently Fired

# Neglected Phenomena in Steel Treatment\*

A New Way to Tell When Steel Has Been Heated Through Its Transformation Point—Temperature Relation of the Furnace and the Steel's Surface and Interior

BY M. E. LEEDS

The experiments described in this paper were undertaken to determine the variations in rates of heating of specimens of different sizes to various furnace temperatures, and particularly to determine the relation in temperature between the atmosphere of the furnace, the surface of the specimen and various points in the interior of the specimen. The phenomena discussed are referred to as neglected phenomena, because it has seemed to the writer that many of those engaged in the heat treatment of steel who have been at much pains to investigate physical properties, to determine critical temperatures and to find out on small samples in the laboratory the most favorable temperatures at which to treat, have neglected a study of the furnace conditions, and the phenomena of heat transfer to the specimen and of heat flow in it.

A thorough understanding of these phenomena is quite essential to a precise control of the temperature of the specimen and must be understood in order to bring it up to the desired treating temperature at a fairly uniform rate, and in order to determine from measuring instruments when this temperature has been attained. Thermocouple pyrometers, which are the instruments almost universally used, can only show the temperatures of their hot ends, and it is very important to know under what conditions the temperatures of the interior of the specimen may be correctly inferred from the pyrometer reading.

The experiments, made at the Midvale Steel Company, Philadelphia, Pa., in 1914, cover round specimens of normal open-hearth carbon steel (0.5 per cent carbon), ranging in size from 12 in. in diameter by 24 in. long, to 2 in. in diameter by 24 in. long. Each specimen was heated to four temperatures, namely, 1000, 1200, 1400 and 1600 deg. Fahr., and during the time of heating a continuous record was kept of the furnace temperatures, the temperature of the surface of the specimen, and of one to three points in its interior. The interior points were 2, 4 and 6 in. in from the surface.

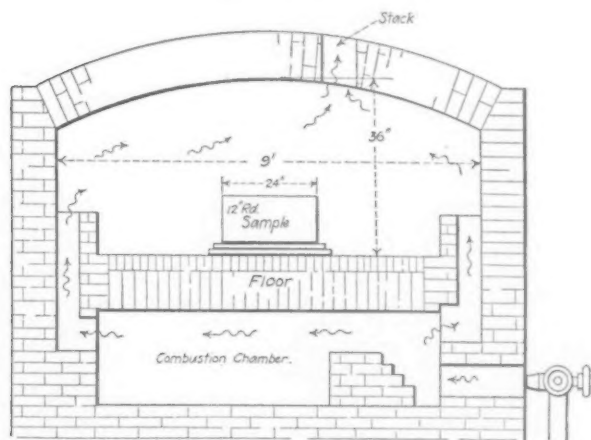


Fig. 1—Section of Heat-Treating Furnace Showing Location of the Specimen

\*From a paper presented at the eighteenth annual meeting of the American Society for Testing Materials at Atlantic City, N. J., June 22 to 26, 1915. The author is president of the Leeds & Northrup Company, Philadelphia, Pa.

## METHOD OF THE EXPERIMENTS

The temperature of the furnace, controlled by two pyrometers, was first brought to that to which the specimen was to be heated, and held there at least one-half hour. The cold specimen was then placed in the furnace. This immediately lowered the furnace temperature, and it was again brought up as quickly as possible to that desired and held there until the specimen assumed approximately the same temperature. Four specimens were used. Three of them were brought to four different temperatures, and the 8-in. specimen was brought to six different temperatures. There are here presented the results of 18 runs.

During each run on the 12-in. specimen, continuous temperature records were taken of six positions, two in the furnace, one at the surface of the specimen and three in the interior. On the 8-in. specimen continuous records of five different positions were taken, and on the 4-in. and 2-in. specimens, four continuous records were taken on each.

A Rockwell oil-burning furnace was used. Its construction and the way in which the test speci-

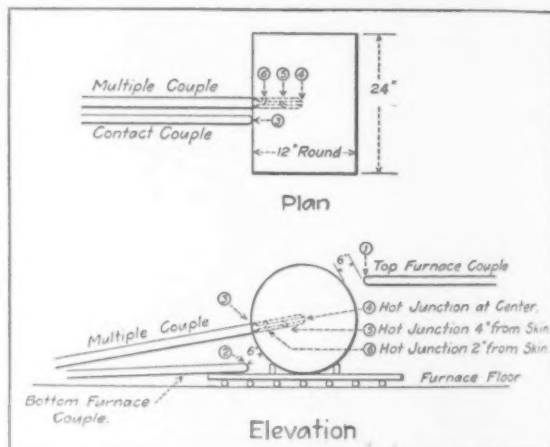


Fig. 2—Thermocouple Arrangement for Specimen 12 In. in Diameter

mens were placed are indicated in Fig. 1. The disposition of the thermocouples for each experiment is shown in Figs. 2, 3 and 4. The furnace temperatures and the rates of heating of the various parts of the different specimens are shown in charts in the paper.

**Instruments.**—The temperature records were taken on a multiple-point printing recorder of the potentiometer type. The thermocouples were iron-constantan, and both the couples and the potentiometer were frequently checked for accuracy during the progress of the experiments. The device used for taking the interior temperatures was a multiple couple made with a single iron wire, to which were attached at 2-in. intervals the constantan wires. For convenience in making the connections, as well as for the purpose of minimizing conduction errors, the constantan was not welded directly to the full-size piece of iron wire, but to a small piece split off from it, as shown in Fig. 5. The contact couple had its welded junction exposed and was held

in contact with the surface of the specimen. The contact was quite well shielded, however, from the direct action of furnace gases by ceramic insulators.

#### CONCLUSIONS

Four interesting conclusions may be drawn from these experiments:

1. *Variation in Time of Heating with Size.*—As would be expected, the smaller specimens heat more rapidly than the larger. In curves (in the paper) the relations between the size of specimen and time of heating to various temperatures are brought out. Except in a very general way, this information could not be used as a guide to heating practice, as the rates would vary with the size of furnace and probably with other conditions.

2. *Relation Between Time of Heating and Furnace Temperature.*—The time of heating for a specimen of any size is less when it is brought up to 1600 deg. Fahr. than when brought up to 1200 deg. Fahr. and less for 1200 deg. Fahr. than for 1000 deg. Fahr., although it is greater for 1400 deg. Fahr. than for any other temperature.

It is more difficult to account for the fact that the higher temperatures are attained more rapidly than the lower ones. This fact, however, appears to be clearly demonstrated. It may be that the specimens received a large amount of their heat by radiation from the furnace walls. The heat transfer by radiation between two bodies at different temperatures is proportional to the difference between the fourth powers of their absolute temperatures, and so for a 100 deg. difference in temperature between furnace wall and test specimens, at 1600 deg. Fahr., the heat transfer would be at a higher rate than for the same temperature difference at lower temperatures.

3. *Relations Between Surface and Interior Temperatures.*—From all of the curves (given in the paper) it

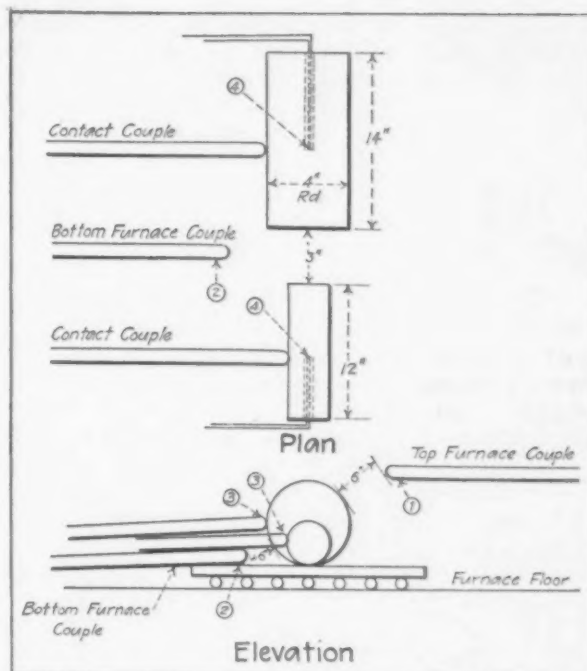


Fig. 4—Thermocouple Arrangement for Specimens 4 and 2 In. in Diameter

When the contact couple attains the furnace temperature, all parts of the specimen have also attained that temperature. This suggests a practical method of using contact couples in conjunction with furnace couples, namely, by means of the furnace couple the furnace should be held at the temperature at which it is desired to treat the specimen, and the contact couple should then be used to determine when the specimen has assumed the desired temperature.

4. *Contact Couple Shows Time of Transformation.*—The curves showing the heating of the 12-in. and 8-in. specimens to 1400 and 1600 deg. Fahr. in the paper show that the transformation point is clearly shown by the couples inside of the specimen, and that it is also shown by the contact couple. The interior couples show, with approximate correctness, the temperature at which the transformation takes place. The contact couple shows a corresponding flexure in its curvature, at the same time as the interior couples, though not at the same temperature. The close correspondence in time between the flexures of the contact couple and the interior couples points to what the writer believes is an important new method of determining when a piece of steel has been heated through its transformation point.

#### DETERMINING THE TRANSFORMATION POINT

In Fig. 6 is shown the arrangement of three couples, one at the surface and two in the interior of a small block of steel. This specimen was heated uniformly in an electrical furnace, and the temperature of each couple recorded on a curve-drawing recorder, the charts of the three recorders having been carefully synchronized. Even with the small block of steel there is a distinct flexure in the contact couple at exactly the time that the interior couples show the specimen to be passing through its transformation point.

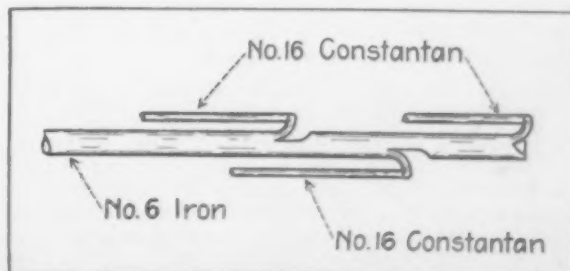


Fig. 5—Construction of Multiple Thermocouple

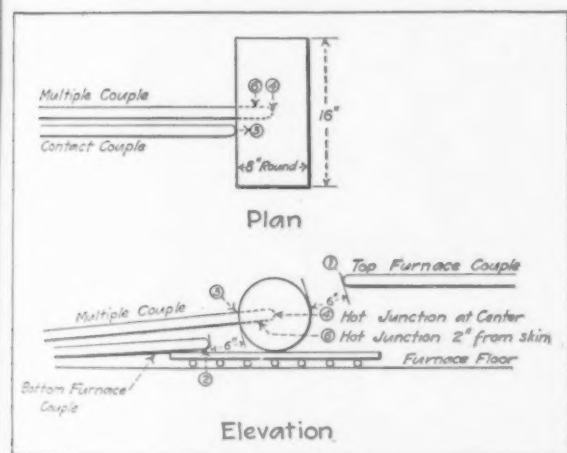


Fig. 3—Thermocouple Arrangement for Specimen 3 In. in Diameter

is deduced that there is no large difference in temperature of the points inside of the specimen. This was quite surprising, as it was expected that the 12-in. specimen would show considerable differences of temperature between a point 2 in. from the surface and the center.

It might be thought that the type of multiple couple shown in Fig. 5 would be subject to errors due to conduction along its common iron wire, but this point was carefully investigated before it was used, by comparing its readings with those of independent couples at the same depth in an iron pipe, heated to different temperatures along its length, and it was found free from such errors.

As would be expected, there is a greater difference at rapid rates of heating than at slow rates of heating.

All of the runs show that the contact couple is at a higher temperature than any of the interior couples until the specimen has attained the temperature of the furnace. It cannot properly be assumed that the temperature shown by the contact couple is exactly that of the surface of the specimen.



This method of determining the time of transformation of a piece of steel has been used under the writer's observation for hardening a large number of punches and dies, as well as other small pieces, and has resulted in exceptional uniformity and high quality of product. The pieces have not only come out properly hard, but have also been to a very unusual degree free from deformation and cracks. This method of determining when the piece has been properly heated does away with the necessity of a prior determination of the critical point on a small sample, and also entirely does away with a painstaking calibration of the apparatus.

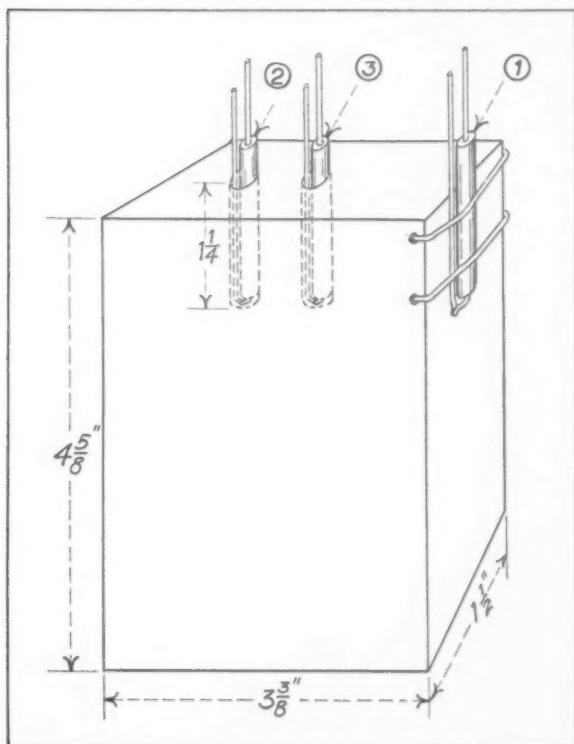


Fig. 6—Arrangement of Thermocouples on Small Specimen. The Contact Couple Is 1, the Couple 2 In. from the Surface Is 2 and the Couple at the Center Is 3

The contact couple is not used to determine the temperature of transformation, but the time of transformation, and it is therefore of relatively little importance whether it is accurately calibrated or not, so long as it is properly sensitive. Experiments have shown that this method may be used with quite small pieces, even as small as the end of the thermocouple.

#### Decreased Output of Fluorspar

The quantity of domestic fluorspar reported to the United States Geological Survey as marketed in 1914, according to Ernest F. Burchard, was 95,116 net tons, valued at \$570,641, compared with 115,580 tons, valued at \$736,286 in 1913. The average price per ton for the whole country, considering all grades of fluorspar—gravel, lump and ground—was approximately \$5.99 in 1914, compared with \$6.37 in 1913, a decrease of 38c. a ton. The depression in the steel industry accounts for the reduced output this year. In 1914 the marketed production of gravel spar, consumed as a flux in basic open-hearth steel furnaces, was about 83.3 per cent. of the total marketed domestic output.

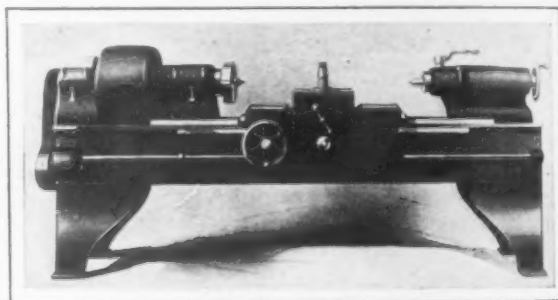
The plant of the Alton Steel Company, Alton, Ill., has been sold at auction to F. C. Fownes, Pittsburgh, Pa., for \$350,000, subject to a mortgage of \$300,000. About \$200,000 will be expended in improving the plant and it is expected that operations will be resumed in about sixty days. Under the reorganization practically all the \$600,000 of common stock has been wiped out.

#### Heavy Single Operation Shell Lathe

A single purpose heavy duty lathe designed especially to meet the unusual demands for single operation machines for shell work but which can also be used for manufacturing work has been brought out by the Cleveland Machinery & Supply Company, Cleveland, Ohio. It is furnished either with open-belt drive or back geared. The machine is very simple in construction and it is claimed an unskilled operator can operate it. It swings 16 in. over ways and 10 in. over the cross-slide, the dimensions being equivalent to the standard heavy duty 21 to 24 in. machines. Five changes of speed are provided. The machine is equipped with an automatic longitudinal stop and arranged for attaching a standard turret on the carriage and a power feed turret on the ways. It is also designed to take a standard forming or taper attachment. These attachments, however, are not furnished by the manufacturer.

The open belt machine has a single pulley drive, the driving pulley on the headstock being 18 in. in diameter for an 8-in. belt. The single pulley drive is recommended for 3-in. shells and smaller. It is stated that running at the proper cutting speed for a 3-in. shell approximately 5 hp. is delivered to the spindle through an 8-in. belt.

The back-gear machine is driven by a single pulley 12 in. in diameter with a 6-in. face, on the back-gear shaft and has a gear ratio of  $6\frac{1}{2}$  to 1. The gears have a  $2\frac{1}{2}$ -in. face. It is stated that on the back-gear machines 14 hp. is delivered through the spindles running at the proper speed for 3.3, 4.5 and 5 in. shells. Both types have longi-



A Back Geared Heavy Duty Single Operation Lathe for Shell Production Work. It is built with an open belt drive as well and can be used for general manufacturing work

tudinal power feed with single automatic stop, silent chain drive to feed and slip gears for changing feed. The apron is of the shrouded box type. The headstock has ring-oiling bearings.

The following table gives the principal dimensions and specifications of the lathe:

Length of bed, ft.....	8
Height from floor to spindle center, in.....	40
Swing over ways, in.....	16
Swing over slide, in.....	10
Diameter of front spindle bearing, in.....	4 1/2
Length of front spindle bearing, in.....	8 1/2
Diameter of rear spindle bearing, in.....	3 1/2
Length of rear spindle bearing, in.....	7 1/2
Diameter of tailstock spindle, in.....	3 1/2
Travel of tailstock spindle, in.....	6
Width of tool slide, in.....	11 3/4
Length of carriage bearing on ways, in.....	32
Number of feed changes.....	5
Minimum feed per revolution of spindle, in.....	0.02
Maximum feed per revolution of spindle, in.....	0.10
Net crated weight, lb.....	3,850

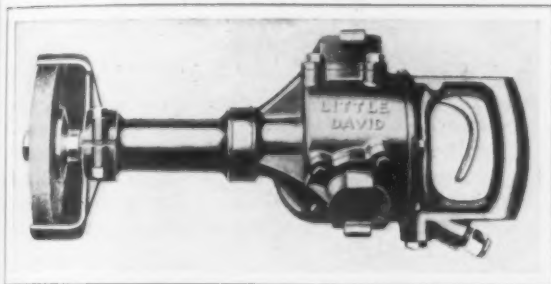
The equipment regularly furnished includes two No. 5 Morse taper centers, a plain or European tool post and a two-speed heavy countershaft.

The Sieg Iron Company, Davenport, Iowa, has let the contract for an addition to its iron and steel warehouses, 150 x 150 ft., involving an expenditure of \$75,000.

### Portable Pneumatic Grinding Machine

The Ingersoll-Rand Company, 11 Broadway, New York City, has recently developed a portable pneumatic grinding machine. It was especially designed for grinding, buffing, polishing or cleaning castings and will operate emery wheels up to a maximum diameter of 8 in. at a speed of 3400 r.p.m. The motor is of the three-cylinder type and it is possible to renew the cylinders without renewing the main body of the casing. Lugs are provided for the cylinders which are relied upon to take care of the wear on the exposed corners. The entire operating mechanism is accessible easily, as it is only necessary to loosen six cap screws to remove the handle and expose the entire interior for examination.

The connecting rods are of one-piece construction fitted to the crankshaft by roller bearings, the same as in the builders's pneumatic drills which were illustrated in THE IRON AGE, Jan. 22, 1914. The crankshaft and spindle are combined into a solid piece drop forging which runs on a triple ball bearing, one bearing being used in the front end of the main casing body and the other two on the end of the spindle. The valve construction is of the



A Three-Cylinder Portable Grinding Machine Intended for Operation by Compressed Air

rotating type and forms a part of the crankshaft, a renewable bronze bushing being used. No gears or pinions are used in the construction of the machine and all parts are inclosed in a dust-proof case and operate in an oil bath.

### British Steel Production in 1914

The output of steel in the United Kingdom in 1914, according to the British Iron Trade Association, was as follows in gross tons compared with 1913:

	1914	1913
Bessemer ingots, acid.....	797,072	1,048,772
Bessemer ingots, basic.....	482,444	551,929
Open-hearth ingots, acid.....	3,680,848	3,811,382
Open-hearth ingots, basic.....	2,874,749	2,251,793
Total .....	7,835,113	7,663,876

The 1914 output is 171,237 tons larger than that of 1913 and is the largest on record, despite the war. The increase in the total output of steel ingots over the last three years is approximately 1,000,000 tons or about the same that has taken place in basic open-hearth ingots alone. The output of acid open-hearth ingots has about maintained its own while the Bessemer output continues to lose ground.

### Russian Manganese-Ore Exports Low in 1914

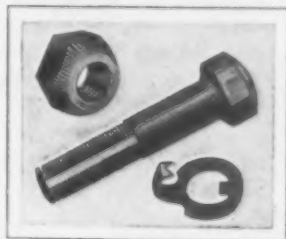
Manganese-ore exports from Russia in 1914 were 737,300 metric tons against 1,171,000 tons in 1913, a decrease of 433,700 tons, or 37 per cent. The exports in 1912 were 989,000 tons.

The Public Belt Railway Commission of New Orleans has just placed an order with the Weir Frog Company, Cincinnati, for 175 sets of manganese insert frogs, guard rails and switches. This order covers only normal requirements, but it is an index of the general steady buying of municipally owned roads.

### A Recent Three-Piece Type of Nut Lock

The J. H. Burnett Iron Works, Inc., Fresno, Cal., has developed a nut lock consisting of three parts. It is known as the Johnny Bolt and consists of the bolt itself, a nut one side of which is serrated and a bowed spring. As will be noticed from the accompanying illustrations the bolt has a slot extending the entire length of the threaded portion, while the bowed spring has a projecting tongue and wings at the other end. In this way it is pointed out the nut can be locked in any desired position.

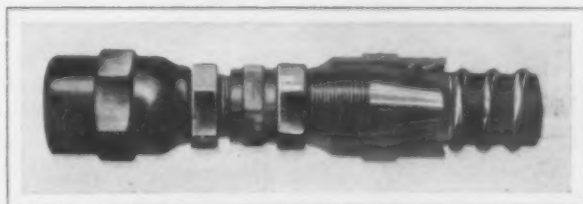
In use the nut is placed on the bolt with the serrated side toward the head and is turned up as much as is necessary. The bowed spring which is the real locking member is placed over the end of the bolt with the tongue fitting in the slot. The opposite end of the spring is then forced over the surface of the nut so that it engages with the notches. To take off the nut the spring is raised out of engagement by sliding a screwdriver between it and the surface of the nut. It is then slipped off after which the nut is removed in the usual way. The use of this slotted construction, it is emphasized, enables the nut to be locked at any point without necessity for readjustment.



Three Views of a Recently Developed Nut Lock Showing It Assembled and the Three Parts Composing It

### Coupling for Compressed Air Hose

A hose coupling suitable for use in compressed air hose lines and of such design as to eliminate the necessity of special clamps to effect a grip on the ends of the hose has been developed by the National Hose Coupling Company, Peoples Gas Building, Chicago. The manner of combining a gripping sleeve or socket which fits over the end of the hose with an interpal expander plug, which as it is



A Type of Coupling for Compressed Air Hose Which Eliminates the Special Clamps Employed to Effect a Grip on the Ends of the Hose

screwed in forces the hose walls more tightly against the grip, is clearly shown in the accompanying illustration. A single wrench suffices for adjusting the coupling, making the operation of connecting or disconnecting simple and convenient.

The Art Metal Construction Company, Jamestown, N. Y., has the contract for furnishing the book and filing cases and office furniture for the administration building, Balboa Heights, Canal Zone, and similar out-fits will be placed in all the Government offices on the Panama Canal in the next two years. During the construction of the canal, wood filing equipment was found unsatisfactory and steel furniture has proved better fitted to the climatic conditions.

### A 32-In. Lathe for Large Shell Work

The Bridgeford Machine Tool Works, Rochester, N. Y., has equipped its 32-in. heavy pattern triple geared head engine lathe for boring and turning large shells. A power fed tailstock is used for either straight or taper boring and power and hand traverse for the boring bar are provided.

The boring bar used is mounted in the tailstock and is 5½ in. in diameter. It is bored and reamed to conform to the Morse No. 7 taper and is arranged on a swivel to enable either straight or taper holes to be bored without employing a taper attachment. The lead screw supplies the power for operating the bar which is transmitted through gearing. An arrangement by which the bar can be traversed by hand either slowly or rapidly as may be desired by the operator is provided in addition to the power feed. This is controlled by the large handwheel which has two positions, one for fast movement and the other operating through back gears. The power feed is engaged or disengaged by the small handwheel. Cross adjustment is provided for the tailstock as well as a lateral adjustment along the bed.

An 18-hp. adjustable-speed motor is employed for driving the lathe and is controlled from the carriage by a drum type controller located on the rear of the frame. This arrangement, it is emphasized, enables the operator to start and stop the motor from the carriage, as well as changing from one rate of speed to another without leaving his working position. The gears in the headstock provide fifteen mechanical speed changes in approximately geometrical progression and when motor drive is employed this number is increased as many times as

### Chattanooga Gets Favorable Rates

The Interstate Commerce Commission, in "Case 7211, Chattanooga Packet Company vs. Illinois Central, Chicago & Eastern Illinois and Rock Island railroads," has made an important ruling in favor of Tennessee River navigation transportation lines. It is in part as follows:

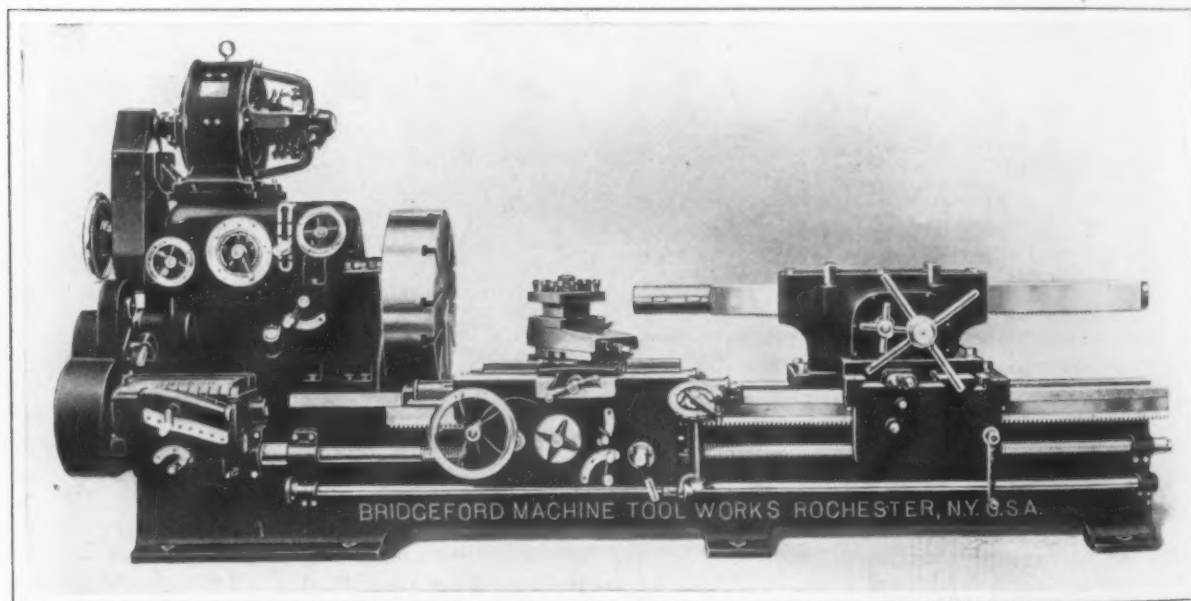
"By restricting the application of their proportional rates to and from Ohio River crossings to traffic routed over their Southern rail connections, defendants are unjustly discriminating against the complainant and against shippers who desire to route their goods over complainant's boat line.

"A proportional rate, the use of which is limited to shipments over a particular line, is unjustly discriminatory. If carriers are permitted to apply higher rates for the same service on traffic routed on connecting water lines than on traffic routed all rail, they will be in a position to destroy all water competition and to deprive shippers of the advantage of their location upon navigable waters.

"Defendants are required to apply the same rates to traffic between Chattanooga and points north of the Ohio River routed via Brookport, Metropolis, and Joppa and complainant's boat line as they contemporaneously apply on traffic routed via their southern rail connections. Defendants are permitted to make a reasonable charge to cover the additional expense, if any, of interchange with boat lines over and above the cost of interchange with rail carriers."

This decision creates a new route and a lower line of rates to Chattanooga manufacturers using it, that represents a net saving to the shippers of 33 per cent over the all rail rates. On pig iron moving from Chattanooga to the Middle West a net saving of \$1 per ton is secured, after paying transfers and marine insurance.

Secretary O. L. Bunn, of the Chattanooga Manufac-



A 32-In. Triple Geared Head Engine Lathe Arranged for the Turning and Boring of Large Projectiles

there are running points on the controller. A quick-change gear box provides for varying the feed as desired.

A four-tool steel turret is mounted on the compound rest. The lathe is usually equipped with side turning or full swing rests.

The United States Civil Service Commission announces an examination for the selection of an associate chemist for the Bureau of Standards, at a salary from \$2000 to \$2500, to devote practically all his time to research in metals and alloys. Competitors will not be assembled for examination, but all applications must be in by July 13, 1915.

turers' Association, had a large part in securing this ruling, which is of such importance to Chattanooga, by preparing the data and, jointly with A. W. Chambliss, attorney, presenting the case to the Interstate Commerce Commission. Immediately after the decision was made, Chattanooga began preparations to secure direct benefit from it. The city commission and business organizations appealed to the Legislature for authority to issue \$100,000 bonds, the funds to be used in providing adequate wharf and terminal facilities. This was granted, and the improvement will be completed by fall.

Jobbers are interested in another phase of the situation. Shipments from southern and eastern points to Tennessee River ports will now move on through bills-of-lading, not requiring reshipment.



## A Power-Driven Spot Welding Machine

A power-driven spot welding machine designed for rapid production of duplicate parts from steel sheets of light gages has been brought out by the National Electric Welder Company, Warren, Ohio. This is known as the National Jr. automatic welder, and with the exception of the motor drive is largely similar to the National Jr. type of welder which is a recent product of this company. The machine can be operated with a long foot treadle shown in the illustration, or power driven, no adjustments being necessary to change from foot operation to automatic power drive. When power driven the control is through the shorter treadle. The throat of this machine is adjustable from 4 to 12 in. by a slotted face plate on which is bolted the lower conductor. This design also permits the adjustment of the lower welding point to either side. The upper conductor is located in a trunnion so that the upper welding point may be turned 45 deg. for convenience in welding under overhanging ledges, in corners, etc., as well as being moved forward or backward. A special vertical conductor is supplied if the work requires it. The slotted face plate permits the attachment of special welding equipment or jigs, as well as lowering the bottom conductor and erecting on the outer end the special vertical conductor to weld the bottoms in metal boxes.

The welding points are water-cooled, being attached to the point holder in such a manner that the water flows within less than  $\frac{1}{2}$  in. of the actual contact at the weld, thus prolonging the life of the point. An automatic trip switch is located in the rear of the machine and is so constructed that it is impossible to separate the welding points when the current is turned on.

Power drive is furnished by a 1-hp. motor through a gear box providing six changes of speed. The machine is operated with either single-phase or polyphase current. Standard machines are wound for 110 and 220 volt 60-cycle current, but will be wound for any voltage or frequency desired. The stock machine is equipped with a 10-kw. welding transformer and a separate regulating coil in the base, the latter being designed to furnish the eight different voltages necessary for welding material of different thicknesses and permitting an increase in the voltage, and consequently the speed of the welding. This machine, with a 12 to 18-in. throat, will

weld from two pieces of No. 30 gage to two pieces of  $\frac{1}{8}$ -in. steel, and has a capacity for making from 60 to 120 welds per min.

The floor space occupied by the machine is 20 x 22 in., exclusive of the motor attachment, and its height over all is 48 in. The maximum distance between conductors is 12 in. It is made in six sizes, from  $7\frac{1}{2}$  to  $12\frac{1}{2}$  kw. capacity, and with a depth of throat from 12 to 24 in., with 2-in. variations.

## A Band Saw for Light Metal Shapes

For cutting round or square bars or I-beams up to 8 in., a metal band saw has been placed on the market by H. C. Williamson, 1840 West Lake Street, Chicago, Ill. In addition to handling bars



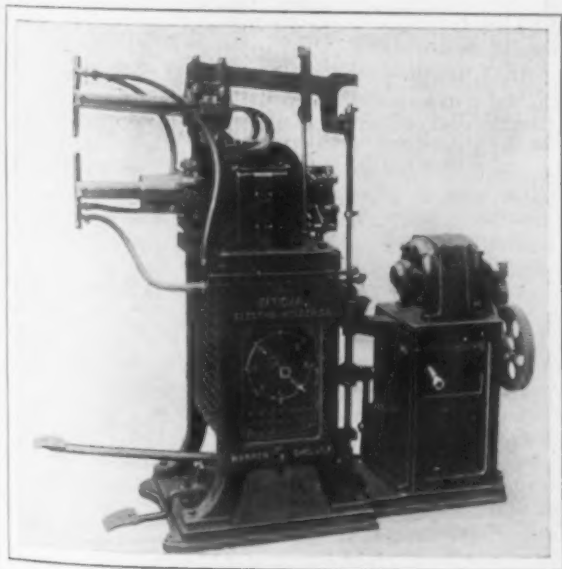
A Metal Band Saw That Has Been Developed for Cutting Bar Stock up to 8 In., Tubing and Light Metal Shapes

and beams, tubing or light material can also be cut and another of the fields in which it finds employment is the production of discs.

The table carrying the work is 26 in. from the floor, this distance, coupled with the fact that the table is stationary and heavy bars do not have to be moved to the saw blade, rendering it easy to handle heavy material. When special work is being handled and more table space is desired, it is possible to remove the back, thus providing a flat surface.

The frame carrying the wheels with the saw and driving mechanism slides on a track and the saw guide is located in a convenient position. Either hand or automatic gravity feed can be used to move the frame and the pressure on the saw can be varied by changing the number of weights hung on the lever. The handwheel at the top of the machine provides for tightening the saw blade.

The machine can be either belt or motor driven and when the latter form is used the motor is mounted on the frame as shown, thus giving a self-contained machine.



A Spot Welding Machine for the Rapid Production of Duplicate Parts Which Is Arranged for both Foot and Power Operation and Represents a Departure in Arrangement for Adjusting the Position of the Lower Welding Point

# Can Profits Be Made in American Graphite?

Despite the Long Record of Bad Promotions, There Is a Chance for the Mining Company If It Will Also Manufacture

BY JONATHAN BARTLEY

Looking over some old correspondence recently, I ran across a letter I received back in 1909 from a highly educated man, taking me to task for a little paragraph in one of my articles on graphite. It seems that he had become interested in a graphite mine in Pennsylvania and was at the time engaged in erecting a mill for the purpose of refining. The statement referred to ran as follows: "Graphite is found to some extent all over the United States, and many attempts have been made to mine and market it, but in no instance has there been any commercial success." He took exception to this from two standpoints. First, he maintained that it was un-American to "throw cold water" on an American industry. Second, he contended that the statement was not true. His letter in detail showed that he had at least partly misconstrued my meaning, assuming I meant that American graphite was unmarketable and that there was little or no demand for it. This was very far from the meaning I intended to convey, because I knew that there was a ready market and a great demand for American graphite of certain variety and form.

After a few days I sent a long reply, explaining to my correspondent why the various attempts at mining had proved failures. I told him to go out, stand on the crest of his property, look east and west, and count at least three abandoned graphite mines where to his own knowledge hundreds of thousands of dollars had been wasted. I mentioned one in particular that had been the means of landing some of its promoters in jail for fraud, and wound up by advising him that if he had an over-supply of money there were charitable institutions much more worthy of it than the "experts" who were advising him to spend it in developing graphite. The incident passed, but a year later my correspondent called on me and told me that he had investigated the matter fully after receiving my letter, had found my statements borne out by facts, had dropped all further explorations and felt that he had been saved from financial ruin.

There seems to be a certain fascination attached to graphite mining that is hard to explain; but it is a fact that once a person gets thoroughly inoculated with the fever it invariably "runs its course." The end is generally complete failure. While there are no statistics bearing on the matter, I venture to say that more money has been lost, value for value, in the mining of graphite than in any other of the minerals.

## A COSTLY FAILURE TO STAY OUT

In the early fall of 1908 two gentlemen came to my office to talk over with me a proposition they had in mind for purchasing an abandoned graphite mine in Pennsylvania. One of them was an old friend of mine, secretary of the largest mill manufacturing plant in the country; the other was the owner of one of the largest flour mills in New Jersey. My friend had been supplying milling machinery to all the different graphite mines and through this had become imbued with the idea that mining graphite was a short road to fortune. I listened to their story, which in the main was one I had listened to a hundred times before: that the original attempt to mine this prospect had failed on account of poor management and lack of knowledge of the business; that reports from experts showed a 14 per cent yield, etc. I knew the mine, having visited it the year previous. I explained to them fully the impracticability of the scheme and advised them to drop it. However, the bacilli had become too deeply embedded. They wanted me to go with

them and look it over again. Had it not been for personal friendship I would have declined, but with the thought that I might possibly be able to influence them and save their money, I consented to go. Although the plant had been closed down for a long time, a workman lived there acting as a watchman. At the same time I couldn't see anything to watch. There had been no changes since my previous visit. I could see nothing in the mine beyond a 6 per cent yield at the most, the graphite small in flake and highly amorphous. The mill (dry system) was of cheap construction and poorly planned. After hearing my very pessimistic report they decided to give the project up, and I felt that I had at least done some one a good turn. Imagine my surprise two weeks later to get a letter inclosing a substantial check for my services and saying that they had reconsidered the matter and on the advice of some experts had bought the place and intended building a new mill. To make a long story short, they did this and worked it for less than a year, lost a small fortune, then found another "sucker" and unloaded on him, and to-day this property is a dilapidated mass of ruins representing thousands of dollars wasted.

## PROFITS FOR "EXPERTS" BUT NOT INVESTORS

A short time after this a young man called at our office who had just fallen heir to a large farm adjoining the property above mentioned. The experts had struck his trail and impressed him with the fact that millions were simply staring him in the face. He had with him a shot bag which contained samples of graphite taken from his farm. These he exhibited with the same care that a mother would show her first baby. The subject had become a "beaten path" with me, and being anxious to get back to my work I decided to take a short cut in giving my advice. I began by asking him if he had an enemy against whom he carried a deep-seated grudge, looking for a chance to "get square"; if so, I suggested giving him a clear title to the property free of any cost but carrying a bonded stipulation that he should erect a mill and mine for graphite. In this way my caller would not only get the satisfaction longed for, but come out in the end ahead of the game by being free from debt and other obligations. Evidently he didn't take my advice, for within two years the farm was sold to pay the experts, and to-day nothing is left to mark the disaster but a lot of rotten timber and a hole in the ground.

Graphite mining has proved a lucrative field for two classes of individuals, the promoter and the expert. The former as a rule is a very glib personage whose card often shows him to be an attorney, while the other depends on a self-signed diploma in his effort to make some one understand what he doesn't understand himself. This pair usually work hand in hand. The promoter gets in touch with men who have money to invest. He points out to them how a mint of money can be made in graphite. He usually has a bunch of letters from the most reputable users of the mineral, offering \$200 per ton for goods like sample, and willing to take the entire output of the mine whether it be large or small. The sample generally represents the highest grade of flake graphite possible to procure. The next thing in order is to get in touch with the expert, who after an exhaustive exploration decides that it will certainly prove a paying proposition, one that if properly worked and handled should pay at least from 25 to 50 per cent within a year. Then a company is formed. The promoter gets an option, sells



it to the company for a big bonus, gets his "rake off," then turns the property over to the expert, who proceeds to erect a mill. For his scientific knowledge he receives a high salary, while his commission on everything brings in another "sugar loaf," so that by the time the mill is ready for operation the till is depleted and another assessment is called for. In this manner the game is played until the stockholders get tired and disgusted, a receiver is appointed and the affairs wound up, to open again just as soon as another set of investors can be rounded up.

#### PROFITS CAN BE MADE IN GRAPHITE

From the foregoing it might be inferred that I am discouraging the mining of this important and valuable mineral; but this is far from my mind. I have simply given some history, in the hope of helping to do away to an extent with methods that have proved detrimental to what might be a great industry. Graphite can be mined profitably, but the operation and handling must be radically changed. The successful American graphite miner must be to a certain degree a manufacturer. I will try to make myself plain in giving the reason.

Deposits of graphite are found in almost every State in the Union, but the geological occurrence of the mineral, the shape, structure and composition of the ore bodies, their manner of development vary to a great degree. The graphite found in New York State is embedded and surrounded by very hard quartzite which necessitates blasting to uncover, heavy rolls to disintegrate, followed by using California drop stamps to bring it to a separating condition. The Pennsylvania deposit usually occurs in beds of mica schist which oftentimes can be shoveled without even the use of a pick. It would seem from this that the cost of mining would be less per ton in Pennsylvania than in New York. The concentrates, however, are widely different and this makes separation in the Pennsylvania mill more difficult. The first separation in either case is made with water. The New York graphite is surrounded by a hard flint rock, the specific gravity of which is considerably greater than that of graphite, thus permitting a fairly distinct separation at the buddle. The Pennsylvania deposit, embedded in a micaceous weathered earth, presents more difficulties. The difference in specific gravity between the graphite and mica is so slight that the buddle finish will often contain half of each.

#### FINISHING PROCESSES

The refining or finishing of graphite requires practically the same method wherever it is found. The operation is simply one of gradual reduction and separation. As a rule the reduction is made with burr stones, although attempts have been made to use steel or porcelain rolls. There are two objections to these, the principal one being that the small, sharp particles of silica will wear an irregular surface, preventing the delivery of an even product. The other lies in the fact that the rolls being of small diameter (usually from 7 to 12 in.), and having very smooth surfaces, makes it difficult to feed the slippery material. After each reduction a separation is made. This is done on an ordinary flour reel covered with silk cloth, graded in different sizes, such as used in the modern flour mill. In some mines where amorphous graphite abounds separation by aspiration is preferable to bolting. At any rate, the refining process is simply one of grinding, re-grinding, separating and re-separating until a finished product is obtained. If properly handled this will be represented in four different grades. The first will be a high grade of laminated or crystalline flake, running from 90 to 95 per cent carbon. The second will be a flake, much finer in size, carrying from 68 to 72 per cent carbon. Then comes a third grade, still finer, that has 24 to 28 per cent carbon. The fourth manipulation brings a "tailing" with anywhere from 8 to 12 carbon.

#### THE MARKET FOR THE DIFFERENT GRADES

Now, what are these different grades worth, and

what demand is there for them on the open market? The first has a ready demand and the price is based on the price asked in the Ceylon market on a similar grade. The price to-day would be from 9 cents to 10 cents per pound. It is used largely as a lubricant, also in crucibles, and to some extent in electrotyping and in the manufacture of electrical specials. There is less demand for the second grade and the price naturally lower, running somewhere around 4 to 4½ cents. It is sold principally to manufacturers of graphite oils, graphite grease and stove polish and used to polish powder. The two lower grades are of little if any value to the miner, who often is glad to dispose of them at any price.

Here to my mind lies the secret in mining American graphite successfully. It costs just as much to mine and refine the lower grades as for the higher. The next thing to consider is the average yield of graphite the mine will deliver, how this yield when finished will divide up in the four grades above mentioned, the cost of producing, etc. There is really no way to determine the yield of any mine without working it. Everything we have on record is from analyses taken in some laboratory from samples submitted. These may vary to a great extent and still be correct. For example, in the report of the U. S. Geological Survey for 1898 Professor Kemp rates the deposit in New York State at from 5 to 10 per cent yield. The same year Prof. T. C. Hopkins in the Mineral Industry gave the yield from the Pennsylvania mines as from 28 to 50 per cent. It is quite evident that both of these calculations were based on analysis of samples submitted. The reputable miner naturally would be reluctant to divulge the secrets of his operations, and the promoter would be likely to select the best specimen possible for his use, therefore there must be a wide range of conjecture as to actual working yield. How the finished product will be divided into grades depends on several varying conditions. First is the amount of crystalline graphite the natural deposit contains, how large the crystals are, how it is surrounded, with what it is associated, etc. The cost of production also varies for the same reasons. I have seen a vein that had been delivering a 10 per cent yield for weeks suddenly die out, to be picked up again two or three weeks later after several hundred dollars had been spent without delivering anything. I point out these facts because of seeming discrepancies in different reports, that are not discrepancies at all when understood.

#### VARIED COSTS OF MINING AND REFINING

My experience, together with the knowledge obtained through contact with now defunct graphite corporations, prompts the estimate that the average yield from the New York State mines is not over 4 per cent and that of Pennsylvania less than 7 per cent. In other words, taking the New York mines as an example, from every net ton of mined rock taken from the pit only 80 lb. of concentrates will be delivered. The cost of mining and producing these concentrates from the pit to the refining plant varies greatly. As an illustration, I was sent at one time to investigate the result of a certain mine. There was a force of forty-five men at work, their wages averaging \$2 per day. The overhead expense was \$20 a day, making a total running expense of \$110 a day, saying nothing about insurance, taxes, interest, etc. The amount of concentrates delivered to the refining plant was just 1100 lb., showing a cost of 10 cents per pound to produce the concentrates. I made my report and within a week the mine was closed. It was opened again after a few months with no better results and finally abandoned with a loss of thousands of dollars. On the other hand, this same company was operating another mine not more than six miles away, where it was delivering concentrates at a cost of less than 4 cents per pound.

The result in refining is oftentimes as uncertain as the mining. Similar variation will occur, and a separation made with one week's run may vary ten points from that of another; but I believe that the following statements can be depended on as a fair average:



Every 100 lb. of concentrates will yield	
35 per cent first grade	
20 per cent second grade	
15 per cent third grade	
30 per cent fourth grade	
Based on the highest possible market price, this 100 lb. would show values as follows:	
35 lb. first grade, at 10c.....	\$3.50
20 lb. second grade, at 5c.....	1.00
15 lb. third grade, say, 2c.....	.30
30 lb. fourth grade, say, 1c.....	.30
	\$5.10
	or 5c per lb.

#### VALUES OF IMPORTED AND DOMESTIC GRAPHITE

One net ton calculated as above would be worth \$100. To produce the same in concentrates at a cost of 4 cents per pound would mean \$80. The cost of refining can be placed at \$4 per ton, making a total cost of \$84, thus giving a net profit of \$16 per ton. This estimate is high, because it is calculated on the richest average deposit and the highest results in refining. The U. S. Geological Survey report of 1913 says: "In 1913 the quantity of graphite imported into the United States for consumption was 28,879 net tons, valued at \$2,109,791. In contrast to this the total domestic production was 4775 net tons of natural graphite, valued at \$293,756." It will be seen by this that our imports exceeded our production more than six times. In the matter of price the imported sold for a little over 3½ cents per pound, while the domestic sold at about 3 cents. I am inclined to think, however, that this estimate is an error, because the Geological Survey gives another estimate showing the percentage of the world's graphite consumption as used for various purposes. A credit of 75 per cent is given to the manufacture of crucibles, and this credit is given from point of value. If this latter estimate is correct (I am quite sure it is not), the price of the imported should average nearer 7 cents per pound. A very small percentage of domestic graphite is used in crucibles, so it is safe to conclude that the American product did not average much above \$75 per ton. At any rate these statistics show that I was liberal in my estimate of \$100 per ton as the average price obtained by the American miner, which under the most favorable conditions only left him with a profit of \$16. *No man living can run a graphite mine on this margin of profit.*

#### THE MINER SHOULD MANUFACTURE

This statement brings me back to one I made earlier, namely: "The successful American graphite miner must be to a certain extent a manufacturer." Now, how can he become one and what will it mean? As in the manufacture of crucibles, all graphite products have been looked upon as involving secret processes. But this is a very great mistake. There is nothing secret about them. There are dozens of concerns which manufacture the various graphite products; and if they can buy their raw material from the miner, work it up in the various products and come out with a profit I fail to see why the miner could not do the same thing, thereby not only getting a better price for his product, but opening up an avenue to dispose of every ounce of the by-product that makes his business unprofitable.

To make myself clear I will refer to the schedule of prices in the table before mentioned. Take, for example, what we have termed "first grade." Why sell this for 10 cents per pound when you can get from 14 to 16 cents for it with very little added cost? A very large percentage of this is sold for lubricating purposes, put up in tin cans. In one sense the miner is in a better position to prepare this than any one else, because in having absolute control of his product he can take advantage of a situation that comes up now and then and pick up something a mere manufacturer does not know about, besides being able to keep his product staple. All the work of packing and labeling is done by hand, so there would be no expense for equipment, except possibly a machine to turn over the ends of the box cover. This would not cost more than a couple of hundred dollars. With a steam jacketed kettle and a couple of mixers you are equipped to convert your second grade into graphite oils, graphite greases, etc., thus realizing from 15 to 20 cents

per pound instead of 5 cents. The cost of this equipment would not exceed \$600. With a couple of paint grinding mills and possibly two mixers you are fixed to make use of your third grade and realize at least 5 cents per pound. The cost for these machines would not exceed \$1,000. Sea-coal, soapstone and charcoal are all cheap accessories blended with the fourth grade to make a good foundry facing, giving you a price of 3 cents per pound on something hard to give away. This would require a pebble mill and an ordinary bolting reel clothed with wire cloth, and the whole outfit would cost less than \$1,000. In round figures it would not cost more than \$6,000 to equip a mill to handle the entire output of a 75-ton mine. A suitable building alongside the dressing plant would be convenient, taking the power direct from the one power plant, reducing the cost to the minimum. There is no reason for having the manufacturing plant isolated from the mining operation, because the cost of cartage would mean no more for the manufactured product than on the raw material.

In this brief way I have pointed out how American graphite can be mined profitably. While I could have gone into the matter more fully, I feel that what I have said will be understood. Professor Bastin in the last Geological Survey report remarks: "To-day there are more abandoned graphite mines and mills in the United States than the number in operation. . . ." "In the number of times some of these properties have changed hands in the course of a few years there is a record of misrepresentation and disappointment that can hardly be equaled in any other branch of mining, and many properties have been notoriously associated with stock manipulations of doubtful character."

I will simply add that I do not aspire to the prominence of an expert, neither have I any ax to grind. I have only stated facts as I have observed them from a practical standpoint, fully realizing the importance of the subject, withholding much that might discourage the development of an important American industry.

#### Cramp Shipbuilding Report

The William Cramp & Sons Ship & Engine Building Company, Philadelphia, has issued its annual report showing net profits for the year ended April 30, 1915, of \$956,796, against \$1,180,332 in the preceding year. The surplus for the year, after deducting fixed charges, was \$651,634, against \$847,477 in the preceding year. President Henry S. Grove, in his accompanying remarks, speaks of the present activity in American shipyards and states that there is every reason to believe it will continue until the present disturbances in Europe reach a settlement, and probably for a considerable time thereafter. He refers to the necessity of spending a considerable sum of money to enable the company's plant to build economically the large ships now required and that plans are under consideration for dealing with this situation. Andrew Fletcher, of the firm of J. & A. Fletcher, Hoboken, N. J., was elected a director to succeed the late Samuel Dickson.

L. F. Loree, president Delaware & Hudson Railroad Company, who has been investigating foreign holdings of American railroad securities, reports a total of \$2,576,401,342 at par value. This total is considerably smaller than had been estimated in financial circles. The actual market worth of the total is probably substantially below the figures given. It is said by the *New York Times* that the total par value of American industrial securities held in Europe has been estimated at close to \$2,000,000,000.

The White Company, Cleveland, Ohio, maker of automobiles, has advanced the wages of its shop employees. All men on day work will receive for an 8-hr. day the same pay that they have been receiving for 9 hr. and time and one-half will be paid for all work in excess of 8 hr. The plant will be run 9 or more hr. daily as long as orders warrant. The company's plant has been crowded with orders in its motor truck department for trucks for military purposes since soon after the outbreak of the war.

## Wisconsin Safety Rules

Forty-six new orders on safety in workshops and factories have been issued to Wisconsin employers by the State Industrial Commission, supplementing the original code of safety orders promulgated May 20, 1912. The new orders are based on the experience of employers since that time, as collected by the commission's deputies. The first code consisted of twenty-five general orders covering the chief points of danger on belts, gears, saws, set screws, etc., and these are permitted to stand, with the exception of order No. 18, covering shafting, which now reads: "All transmission shafting located in places of employment, where exposed to contact, must be guarded." The original order required only that shafting less than 6½ ft. from the floor should be guarded. A summary of the new orders as applicable to the metal trades follows:

Requiring guards on crank shafts and crank discs of all engines exposed to contact; on metal planers, the space between the ways; on revolving shafts, all projecting parts, such as collars, clamps, split links, couplings, when dangerously exposed; requiring rough or non-slip surface on all stair steps and platforms on engines or large machines; automatic oilers on engines and other machines needing frequent oiling when the machine is in motion; guards on all revolving stock projecting from the end of machines, such as tool and turret lathes and automatics; on all fans; on revolving barrels, drums or cylinders, such as rattlers, cleaners, churns, etc.; on the tool of every power press used for punching, stamping, blanking, shearing or embossing; on drop hammers which throw off sparks and scales and require the operator to place his hand beneath the hammer when placing a part in position; on all counterweights; on all overhead trolleys; on truck wheels of overhead traveling cranes; requiring means to disconnect power from machines and lineshafts in every room of a place of employment; locks or blocks on all presses, drop hammers and other machines which are set in motion with a tripping device, except where machines are driven with individual motors and the switch is conveniently located for turning off power while a machine is adjusted or repaired.

Concerning overhead electric traveling cranes, the new orders require guards on truck wheels; runways on one side extending the full length of the crane bridge and equipped with railing and toe boards; a switch in the cab to enable the operator to cut off all current from the crane; stairways or permanent ladders giving safe access to crane cabs; solid floor in all crane cabs and inclosures of sides either with solid material or railing to a height of 36 in. or more; maximum safe working load for all hoisting cables must be not more than one-seventh of the breaking load as given in schedules of cable manufacturers; cables to be considered unsafe and unfit when strength has deteriorated 25 per cent through broken wires, wear, rust, undue strain, etc.; cables to be frequently lubricated to increase durability.

An order concerning cupolas says: "When men are relining or doing other work in a cupola, a guard must be provided by the employer which will prevent other men from throwing parts into the cupola door and upon the workmen below." This may be accomplished, it is suggested, by installing a temporary screen or by equipping the cupola door so it can be locked from the inside.

An order on eye protection says: "Where men are doing work whereby any substance is thrown off which may injure the eyes, suitable goggles or spectacles or other efficient guard must be provided by the employer." The compensation law provides for a penalty of 15 per cent where injury results from the employee's willful failure to use safety devices provided by the employer or to obey any reasonable rule adopted by the employer for the safety of the employees. Likewise, where properly fitted goggles are furnished by the employer and the employee refuses to use them and is injured, the employee will be penalized 15 per cent in awarding compensation.

These rules, as well as the original code, were drafted by the commission's committee on safety and sanitation, consisting of two representatives of the

Wisconsin State Federation of Labor; two from the Milwaukee Merchants' & Manufacturers' Association; one from the Milwaukee Health Department; two from the Wisconsin Manufacturers' Association and three from the Industrial Commission of Wisconsin. The committee was assisted by the committee on safety and sanitation of the Milwaukee Merchants' and Manufacturers' Association, consisting of J. W. Brown, Chain Belt Company; Harold Falk, Falk Company; George F. Kent, Bucyrus Company; B. C. Wait, International Harvester Company; John P. Gates, Allis-Chalmers Mfg. Company; Christian Scholtka, Nordberg Mfg. Company; John Hall, Milwaukee Coke & Gas Company; H. A. Sedgewick, Cutler-Hammer Mfg. Company; B. Rosing, A. O. Smith Company; A. L. Lindemann, A. J. Lindemann-Hoverson Company; A. J. Kieckhefer, National Enameling & Stamping Company; Leonard S. White, H. W. Johns-Manville Company.

## Iron and Steel Electrical Engineers' Meeting

A tentative list of papers for the annual convention of the Association of Iron and Steel Electrical Engineers, to be held at the Hotel Statler, Detroit, Mich., September 8-11, has been given out as follows:

James F. Howe, American Steel & Wire Company, "Wire Rope and Its Relation to Steel Manufacture."

H. M. Gassman, Tennessee Coal, Iron & Railroad Company, "Load Diversity and Use Factors as Applied to Motor Installations."

H. E. White, Crocker Wheeler Company, "Starters for Squirrel Cage Induction Motors."

Westinghouse Electric & Mfg. Company, "Description of Modern Developments."

C. S. Lankton, Carnegie Steel Company, "Purchased Power for Steel Mills."

J. H. Wilson, American Rolling Mill Company, "Motor Drive for Sheet and Jobbing Mills."

D. M. Petty, Bethlehem Steel Company, "Some Special Electrical Applications in Steel Mill Practice."

R. F. Patterson, Pressed Steel Car Company, "Improving Non-Condenser Power Plant by Use of Direct Current Mixed Pressure Turbine Equipment, etc."

Dr. Steinmetz, General Electric Company, "Automatic Aids to Power Plant Operation."

E. H. Kendall, Alliance Machine Company, "Latest Development of Electric Cranes for Steel Mills."

T. E. Tynes, Lackawanna Steel Company, "Human Side of Engineering."

E. Friedlaender, Carnegie Steel Company, "Motor Generators vs. Rotary Converters."

James Farrington, LaBelle Iron Works, "Transportation in Steel Mills."

A joint session with the American Institute Electrical Engineers will be held. Subjects to be discussed will be announced later.

The engine market shows more activity, as indicated by sales of steam and gas engines recently made by the C. & G. Cooper Company, Mount Vernon, Ohio, as follows: American Gypsum Company, Port Clinton, Ohio, one 225-hp. uniflow engine to direct drive a 150-kw. generator, which is the second Cooper uniflow to be installed by the company; Wichita Pipe Line Company, Bartlesville, Okla., two uniflow engines, 500 hp. each, to drive gas compressor cylinders, and at times to be called upon to carry 100 per cent overload continuously; Union Bleaching & Finishing Company, Greenville, S. C., one 18 x 42 Corliss cylinder; Metropolitan Paving Brick Company, Canton, Ohio, one 150-hp. heavy duty belt drive Corliss engine; Ohio Seamless Tube Company, Shelby, Ohio, two 27 x 42 heavy duty Corliss engines, to drive piercing and rolling mills; Clarendon Gasoline Company, Clarendon, Pa., two 14 x 24 duplex gas engines, to direct drive gas compressor cylinders.

P. E. Werner, Akron, Ohio, and others have acquired the plant of the Chester Rubber Tire & Tube Company, Chester, W. Va., and will operate this and a new rubber tire plant to be established in Kansas City, Mo., under the name of the Kansas City Tire & Rubber Company, which has been incorporated with a capital stock of \$2,000,000.



ESTABLISHED 1855

# THE IRON AGE

EDITORS:

A. I. FINDLEY

GEO. W. COPE

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

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## Our Half-Yearly Index

The Index of THE IRON AGE for the past half year, January to June, inclusive, has been compiled and printed and is now ready for distribution. It will be forwarded promptly to those who have entered their names on our list as desiring it. Others who may have use for copies will be furnished them by addressing our Circulation Department.

## Bessemer and Open-Hearth Steel

The steel mills are asking higher prices for open-hearth billets and sheet bars than for Bessemer, repeating the condition that obtained in the second half of 1912. The common expression is that open-hearth steel is "scarce," meaning simply that the open-hearth departments are more fully engaged, relative to capacity, than the Bessemer departments. The condition is noteworthy, seeing that in the past eight years the Bessemer capacity has decreased somewhat, rather than increased, while the open-hearth capacity has increased greatly. The production of basic open-hearth ingots increased by no less than 110 per cent from 1906 to 1913, and the capacity increased still more, for in 1906 all steel-making equipment was operated at capacity, while in 1913 there was a decided slackening toward the close of the year. Since then there have been important additions of open-hearth furnaces, and the present capacity is probably about two and one-half times that of 1906, while at the same time the Bessemer capacity has been somewhat diminished. One large department, that at Duquesne, was abandoned in 1907 and dismantled, while the Homestead Bessemer department is practically on the retired list. At other points a few Bessemer converters have been turned to duplexing.

It may be true, in a sense, that the "demand" has run sharply to open-hearth, but some part of this market demand is not enlightened demand. The buyer does not call for open-hearth instead of Bessemer because he has concrete knowledge that the open-hearth steel is measurably better for his purpose than Bessemer. He has heard a great deal about open-hearth, and so he calls for it to be on the safe side.

It would be interesting to know how much of this call for open-hearth steel has been uncon-

sciously encouraged by some of the steel makers who are able to furnish either description of steel. There is reason to believe that some operations are so aligned that they produce open-hearth steel more cheaply than Bessemer, at least when the scrap market is low. When there is insufficient demand to operate both departments in full they furnish the indifferent customer open-hearth, and thus he acquires the open-hearth habit. These are the days of "service" between the steel seller and the steel buyer, and perhaps there is a chance, by attention to the details of handling orders, to furnish inducements to many open-hearth customers to accept Bessemer instead. There is a considerable tonnage of steel business on books making the question of open-hearth or Bessemer optional with the seller. The mills having such business have been scrutinizing it carefully and making the shift to Bessemer wherever the opportunity was afforded, indicating that in the past they have sometimes furnished open-hearth steel when they were not required to do so.

It is unfortunate for the Bessemer industry that electric steel refining has not been brought down to the low costs that its advocates, at one time at least, had great hopes of attaining, for if electric steel were made cheap enough to attract the large tonnage consumers the saving of the Bessemer equipment would go quite a distance toward paying for the electric equipment to be installed.

## Increasing Scarcity of Machine Tools

The situation with regard to machine tools of certain types presents some portents which users of such machines would do well to heed. It was but recently that many intending buyers expressed astonishment when they learned of the great scarcity of the machines they desired to purchase. They rightly judged that all of the tools had not been exported and they did not know of the vast purchases of American companies having war contracts. Meanwhile their understanding has been greatly cleared by the wide publicity given to the war business.

Recently several buyers have put out inquiries, only to withdraw them when they learned that they might have to wait until close to 1916 or possibly into that year before they could get the equipment they desired. In their hesitancy to buy lies a dan-



ger they may not foresee. Not only is it impossible to procure new machines in any satisfactory time, but good used tools are scarce and daily becoming more so. Dealers are scouring the country for used tools and are taking stock which they would not consider in normal times. With new machines and good second-hand ones impossible to get, or exceedingly rare, they anticipate a market for almost obsolete types. It need hardly be pointed out that the newer a machine tool the more accurately and expeditiously work can be turned out; nor that when bearings and ways and other parts become worn it takes much careful nursing by a skilled machinist to do a job that will pass inspection, and in the doing the mechanic's temper is none of the best. Using such machines means the risk of poor work, and the possibility arises, already referred to as a danger, of American manufacturers finding themselves compelled to use more old and decrepit machinery than they ever dreamed of using, to the detriment of their product. The past week has brought heavy inquiries from those who would make munitions of war, and cases are coming to light of war contracts being entered into, for the completion of which two to three years are allowed. The indications are, therefore, of the continuance of the war demand for machine tools for months to come.

### The Billion Dollar Trade Balance

The billion dollar trade balance for the fiscal year 1915, heralded from Washington, is interesting in its way, for statistical comparisons, but it is perhaps more important to observe that inasmuch as the fiscal year showing included unfavorable trade balances for July and August, a billion dollar trade balance was really reached in the nine consecutive months ending with May. The June favorable balance, roughly estimated as not less than \$60,000,000, was needed to push the total into the ten-figure class only because last July and August the balances were unfavorable. As it is quite certain that nothing approaching an unfavorable trade balance can occur in any month while the war lasts, it is not necessary to confine one's self to fiscal year comparisons.

A favorable merchandise trade balance, as is well known, does not require settlement to be wholly in credit or gold, for the "unseen balance" has run regularly to several hundreds of millions. The war conditions have changed this unseen balance in many respects. The condition has been improved by American tourists spending very much less money abroad. Whether foreigners residing in this country have increased or decreased their remittances home is not altogether clear. In one important item the unseen and unfavorable balance has been greatly increased, and that is in freights paid upon imports. Our exports are valued at our own ports, and the question of ocean freights does not enter, but the imports are valued at the foreign port, and by as much as ocean freights have been advanced by foreign vessel owners, by so much have our expenditures been increased.

A carefully prepared statement in the *New York Annalist*, drawing data from the investigations made by L. F. Loree and others, puts the

current market value of all American securities held abroad at \$2,614,490,000, or less than half the average estimates that were made shortly after the war began, when many men were in a perfect ecstasy of fear lest we should be bankrupted by our securities being dumped upon us. With indications that the amount is so much smaller than has been supposed, and with the trade balance running at such high figures, it is evident that we really are likely to improve our economic position greatly, either by buying our own securities or establishing a credit in the other direction by absorbing foreign securities, whether they be war loans, securities against investments in South America and elsewhere, or what-not.

### The Iron Industry's Labor Supply

In a recent issue of *THE IRON AGE* statistics of immigration and emigration were presented in some detail, and it was shown that in the ten months ending last April the excess of arrivals of aliens and citizens was 91,252, against 687,065 in the fiscal year 1914 and 654,205 in the fiscal year 1913.

The question of labor supply is now being discussed throughout the iron and steel industry. The great mass of the labor employed in iron and steel manufacture, including the coke industry, is ordinarily regarded as "common labor," and so it is, in the sense that the work does not require very long training. By no means, however, is it common labor in the sense that it is interchangeable with employment in other fields. The labor is largely racial. Immigrants of some races turn chiefly to agriculture, others to the vending of fruit, others to the making of clothing, and others seek the coke works, blast furnaces and steel mills. The iron industry does not to any large extent recruit itself with labor drawn from other branches of industrial activity.

While the situation as to labor supply has been made particularly acute, assuming that demand will continue to require increasing production of iron and steel, the question is no new one. It is readily recalled that in the late spring of 1912 the industry found labor scarce, although it was probably not operating at more than 85 per cent. of capacity. It was recognized at that time by individual works managers that they could probably increase their supply of labor somewhat by offering premium rates, but they could not afford to do this because eventually uniform advances would have to be given to all common workmen employed, and economic conditions did not justify such a radical course. Some works managers were glad to find a partial solution of this particular problem in the fact that they had new construction work in progress, and they accordingly paid premium rates on the new construction jobs, leaving rates in their regular mill and furnace operations intact.

These recurrent spells of a shortage of iron and steel works labor, apparently growing more acute with each succeeding period of activity, are due to the fact that the industry has such great ups and downs in activity, when the labor it employs is largely specialized, in the sense that certain races only are disposed to accept employment in it. Steady employment for the mills would be better

in the matter of attracting and maintaining an adequate labor supply just as it would be better for the capital invested.

Mention should be made of the fact that of late steel mills have been operated with much more regard than formerly for the welfare of the men and with much more attention to the question of conserving the labor supply and maintaining organizations. In the extremely dull period last winter every

effort was made by the great majority of mill managers to distribute employment among the largest number of men possible. Mills were operated alternate weeks, or a certain number of days each week, when so far as fuel and other bills were concerned it would have been more economical to operate in a different manner. If this course had not been followed the labor supply would now be even smaller than it is.

## Government's Deficit for the Fiscal Year, \$80,000,000

Low Duties the Main Cause—But for the War and the Sugar Duty the Shortage Would Be Nearly \$200,000,000

WASHINGTON, D. C., July 6, 1915.—The Government closed the fiscal year 1915 on June 30 with a deficit of \$64,165,416, to which should be added an estimated shortage of about \$16,000,000 in postal revenues, making a total deficit of about \$80,000,000. Receipts for the year included, however, at least \$50,000,000 from the war revenue act, about the same amount from the duty on sugar and \$12,000,000 from the sale of two battleships. Without these extraordinary items, which will not be available next year unless Congress legislates in the meantime—for the war revenue act expires by limitation on January 1 next and sugar goes to the free list on May 1 following—the shortage would have amounted to nearly \$200,000,000.

Customs receipts fell off in the year 1915 by \$83,000,000; internal revenue receipts, including the war revenue taxes, exceeded those of last year by \$28,000,000, while the individual and corporation income taxes showed a gain of \$8,500,000, and miscellaneous receipts exceeded those of last year by about \$8,500,000, an excess due to the sale of battleships. The disbursements for the year exceeded those of last year by \$31,000,000, nearly every important item showing an increase. The executive departments, the military establishment and the independent commissions, authorized by Congress so freely during the past few years, all helped to swell the total.

### DUTIES SHRINK MUCH MORE THAN IMPORTS

The official statistics now available show beyond all possibility of controversy the revenue producing capacity of the present tariff law and demonstrate its utter failure as a fiscal proposition. That the war has little or nothing to do with the existing condition is also conclusively shown; in fact, it is the war alone which, by introducing new and confusing factors, has saved the existing tariff scheme from a complete and humiliating exposure. The facts are of vital significance to American manufacturers, by whom they will no doubt be examined with interest.

Notwithstanding repeated claims that the loss in customs revenue is attributable to greatly reduced importations, due to the European conflict, the statistics for the eleven months ended May 31, 1915, which have become available in the past week, show total imports of \$1,516,473,000, a decrease of only 12.6 per cent as compared with imports of \$1,736,395,000 for the corresponding period of 1914. Customs collections, however, have declined from \$268,575,000 to \$191,276,000, a loss of \$77,299,000, or approximately 30 per cent. A comparison of the total imports with the duty collected for the first eleven months of the current fiscal year shows that the average ad valorem rate paid on all goods coming into this country during the period covered was only 12.6 per cent. This is by far the lowest average ad valorem rate collected under any tariff act in the 95 years covered by official statistics. The average rate under the Dingley act, from 1897 to 1909, embracing both free and dutiable goods, was 27 per

cent, while the corresponding rate under the Payne-Aldrich law was 20 per cent.

That the low rates of duty provided by the Underwood-Simmons act, and not the reduced importations, are responsible for the shrinkage in revenues is clearly shown by these figures. Even had there been no reduction in importations during the first eleven months of the current year as compared with last year, the revenues would have been but \$26,000,000 larger. If, however, the total imports for the first eleven months of the current year had been under the Payne-Aldrich tariff rates, with an average ad valorem of 20 per cent, the total customs revenues would have amounted to the handsome sum of \$303,680,000, or more than \$112,000,000 in excess of the sum actually collected. It is true that the European war has curtailed the importation of certain lines of manufactured goods on the dutiable list of the present tariff law, but it is also a fact that even had these goods been imported they would have paid much lower duties than under the Payne-Aldrich schedules. The salient fact, however, is that great quantities of goods, transferred from the dutiable to the free list by the Underwood-Simmons law, have been brought in during the past year, the total importations showing a shrinkage of only one-eighth, while customs revenues have declined nearly one-third.

The United States Court of Customs Appeals having declared to be valid that portion of the existing tariff act allowing a discount of 5 per cent of duties paid on all merchandise imported into the United States in American bottoms or vessels belonging to nations entitled by treaty to minimum tariff rates, there is every reason to believe, although the U. S. Supreme Court has not yet ruled upon the case, that refunds amounting to about \$15,000,000 per annum will have to be paid out of the duties heretofore collected. This will increase the real deficit chargeable to the Underwood-Simmons act, unaided by the sugar duty and war revenue taxes, to a grand total of nearly \$215,000,000. It also reduces the average ad valorem rate of duty provided by the existing tariff law to almost exactly 12 per cent on the basis of the imports of the fiscal year just ended.

### GREAT FAVORABLE TRADE BALANCE NOT INTENDED

Administration officials seek to obscure the issue by pointing out, in frequent bulletins, the tremendous "favorable trade balance" shown by the customs returns, approximating a round billion dollars for the year 1915, evidently hoping that the public will not be reminded that this is the one factor in our foreign trade undeniably due to the war, and certain to disappear with the cessation of hostilities. It is, doubtless, also hoped that the public will forget that when the present tariff law was under discussion in Congress its supporters admitted that in practical operation it would reduce the favorable balance accumulated under the Payne-Aldrich law, but insisted that, as the new



tariff was designed in the interest not of the producer but of the consumer, and intended especially, by stimulating importations, to reduce the high cost of living—which, by the way, it has utterly failed to do—the smaller the trade balance the better for the people as a whole.

W. L. C.

## Outlook for Machinery Exports to South America

J. A. Massel, special agent of the Department of Commerce, who has been in South America for several months investigating the opportunities for exporting machinery and machine tools from the United States, is now in New York. He went first to Buenos Aires in January and made a tour of the principal machinery-using plants, including railroad shops and the plants of trolley, power, light and marine repair companies. The imports of machinery of Argentina in 1912 represented \$35,000,000. In an interview in the New York Times Mr. Massel said:

As Argentina is a great agricultural country, there is naturally a big market for agricultural machinery and implements as well as traction engines and other heavy types of machinery. I should say, however, that American manufacturers already do a large business in Argentina in these lines, but there is plenty of room for improvement. The European tool interests have studied the Argentine and other markets very closely, and are strongly entrenched. For example, the Industrial School of the Nation, located at Buenos Aires, which has 500 students from all sections of the country, is equipped with machinery donated in large part by German firms. In fact, nearly all of this machinery was given by German manufacturers. There is a plant in connection with the school in which working models of all sorts of machinery and tools are on exhibition. Among other things the models include engines, pumping machines, foundry, carpentry, and a great variety of other appliances. So far as I could ascertain, there was not one American model in the plant. The students, when leaving this institution, find places in every kind of mechanical establishment in Argentina and naturally show a preference for the foreign machines with which they are most familiar.

Another advantage enjoyed by the foreign machine makers in Argentina is that many of the German cartels, individual German manufacturers, and English, French and Italian interests maintain not only heavy supplies of all kinds of the goods sold, but actually in many instances have repair shops on the ground to take care of tools or machines requiring attention after trial or use. Some of the American firms likewise have these facilities and, where they have, are invariably successful. American firms will not do much of a business in the Argentine unless they are prepared to keep full stocks on hand as the people are keen for quick deliveries, and want to be assured that machines, tools and parts can be replaced or duplicated on short notice. The carrying of adequate stocks in Argentina solves the delivery question.

In Chile and Argentina the British and Germans command the machinery market, the Germans in particular having the lead in electrical lines. Mr. Massel is of the opinion that in Argentina, Brazil, Peru and Chile the manufacturers of the United States will have best success through direct representation and the carrying of stocks of their products. In the smaller countries he advocates the salesman plan. For the next three weeks Mr. Massel will be in New York at the office of the Bureau of Foreign and Domestic Commerce in the Custom House. Later he will return to South America, sailing direct for Brazil to conclude his investigation of the machinery situation, then proceeding to the west coast to study the situation in mining machinery.

At New Castle, Del., almost all factories are working overtime to get out large orders. The DuPont Powder Company has the Baldt steel plant working double turns. The Brylcon Steel Casting Company is reported quite busy. The American Manganese Company is rushing to get out several orders. Construction work is being hurried by the Wilmington Fibre Specialty Company so that its new mills can be put into operation. As fast as its plants at Wilmington and Norristown are dismantled the machinery is being installed in the New Castle factory.

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## Slag and Waste Freight Rates Still Unsettled

WASHINGTON, D. C., July 6, 1915.—The Interstate Commerce Commission has stricken from the files a series of tariffs filed by eleven railroads operating in Ohio, Pennsylvania, and West Virginia, containing charges of 20c. per ton for the disposal of slag flue dust, clean ashes, or refuse molding sand, and of 35c. for ashes (mixed with other refuse), brickbats, dirt, etc., loaded into cars on private sidings and hauled to more or less remote points. The rejection of the tariffs is based on the fact that they do not comply with the law in that they fail to name destination points. The report of the commission, which summarizes the results of an investigation undertaken several months ago, is in part as follows:

For many years it has been the custom of the carriers to dispose of the refuse material from iron and steel, either free or for a charge which was generally 25c. per net ton, according to the class of material, and upon the protest of the interested mills the carriers' tariff has been suspended. . . . We see no reason why this disposal service must be performed gratuitously by the carriers. We see no reason why, by the filing of appropriate tariffs and conforming with other requirements attending the business of common carriage, regular tariff charges for this service may not be filed, demanded, and collected. . . . It is clear, however, that the tariffs as filed do not conform with section 6 of the act and must be ordered forthwith stricken from our files. We desire to point out that should the respondent carriers engage in interstate transportation in connection with the disposal of slag they must have on file with this commission lawful tariffs, naming their charges for such transportation.

W. L. C.



## GAIN OF 6300 TONS A DAY

## June Pig-Iron Production 2,380,827 Tons

## Furnaces in Blast July 1 Were Twelve More Than at the Opening of June

Our returns from the blast furnaces of the country show that the pig-iron output in June, charcoal iron not included, was 2,380,827 gross tons, or 79,361 tons a day, against 2,263,470 tons in May, or 73,015 tons a day. Steel works furnaces increased their output further, the net increase in the number of such furnaces in blast last month being eleven, while in merchant furnaces the net increase was one. The capacity of the 218 furnaces in blast July 1 was 80,411 tons a day, against 75,643 tons a day for the 206 furnaces in blast on June 1.

## DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from June, 1914, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel works	Merchant	Total
June, 1914	44,321	19,595	63,916
July	45,027	18,123	63,150
August	46,937	17,426	64,363
September	46,344	16,409	62,753
October	41,026	16,335	57,361
November	35,305	15,306	50,611
December	33,381	15,515	48,896
January, 1915	35,998	15,661	51,659
February	44,192	15,621	59,813
March	50,036	16,539	66,575
April	52,804	17,746	70,550
May	54,655	18,360	73,015
June	59,022	20,339	79,361

## OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in June and the three months preceding:

## Monthly Pig-Iron Production—Gross Tons

	Mar. (31 days)	Apr. (30 days)	May (31 days)	June (30 days)
New York	138,539	156,449	176,423	172,192
New Jersey	6,738	6,592	6,600	6,240
Lehigh Valley	61,116	63,679	64,796	64,352
Schuylkill Valley	50,814	50,356	51,743	53,142
Lower Susquehanna and Lebanon Valley	34,267	32,581	28,001	28,116
Pittsburgh district	537,541	497,890	538,654	595,207
Shenango Valley	95,229	101,172	121,910	124,041
Western Pennsylvania	129,657	132,849	139,247	156,350
Maryland, Virginia and Kentucky	40,680	38,860	45,593	43,392
Wheeling district	82,249	84,700	83,400	93,991
Mahoning Valley	247,530	281,742	310,234	299,644
Central and Northern Ohio	159,566	162,448	165,882	175,376
Hocking Valley and Hanging Rock	27,511	19,985	15,149	22,132
Chicago district	236,274	269,259	292,891	307,554
Mich., Minn., Mo., Wis. and Col.	66,921	63,712	60,789	66,163
Alabama	136,820	139,547	146,502	158,569
Tennessee	12,382	14,763	15,656	14,352
Total	2,063,834	2,116,494	2,263,470	2,380,827

## PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in the figures below, together with ferromanganese and spiegel-eisen. These last, while stated separately, are also included in the columns of "total production."

## Production of Steel Companies—Gross Tons

	Pig, total production—			Spiegel-eisen and ferromanganese		
	1913	1914	1915	1913	1914	1915
Jan.	1,981,560	1,261,430	1,115,944	15,633	17,325	18,941
Feb.	1,792,154	1,329,414	1,237,380	20,131	10,524	13,319
Mar.	1,904,878	1,704,688	1,551,082	20,546	20,133	12,274
Apr.	1,939,751	1,635,226	1,584,111	23,108	18,676	12,337
May	1,991,192	1,457,847	1,694,290	19,042	21,504	13,440
June	1,860,070	1,329,623	1,770,657	19,212	16,254	19,200
July	1,840,216	1,395,851	.....	22,310	16,524	.....
Aug.	1,833,352	1,455,054	.....	20,680	11,577	.....
Sept.	1,828,232	1,390,322	.....	24,555	13,786	.....
Oct.	1,848,634	1,271,820	.....	19,499	17,435	.....
Nov.	1,573,007	1,059,159	.....	26,765	21,977	.....
Dec.	1,298,262	1,034,802	.....	14,095	20,733	.....

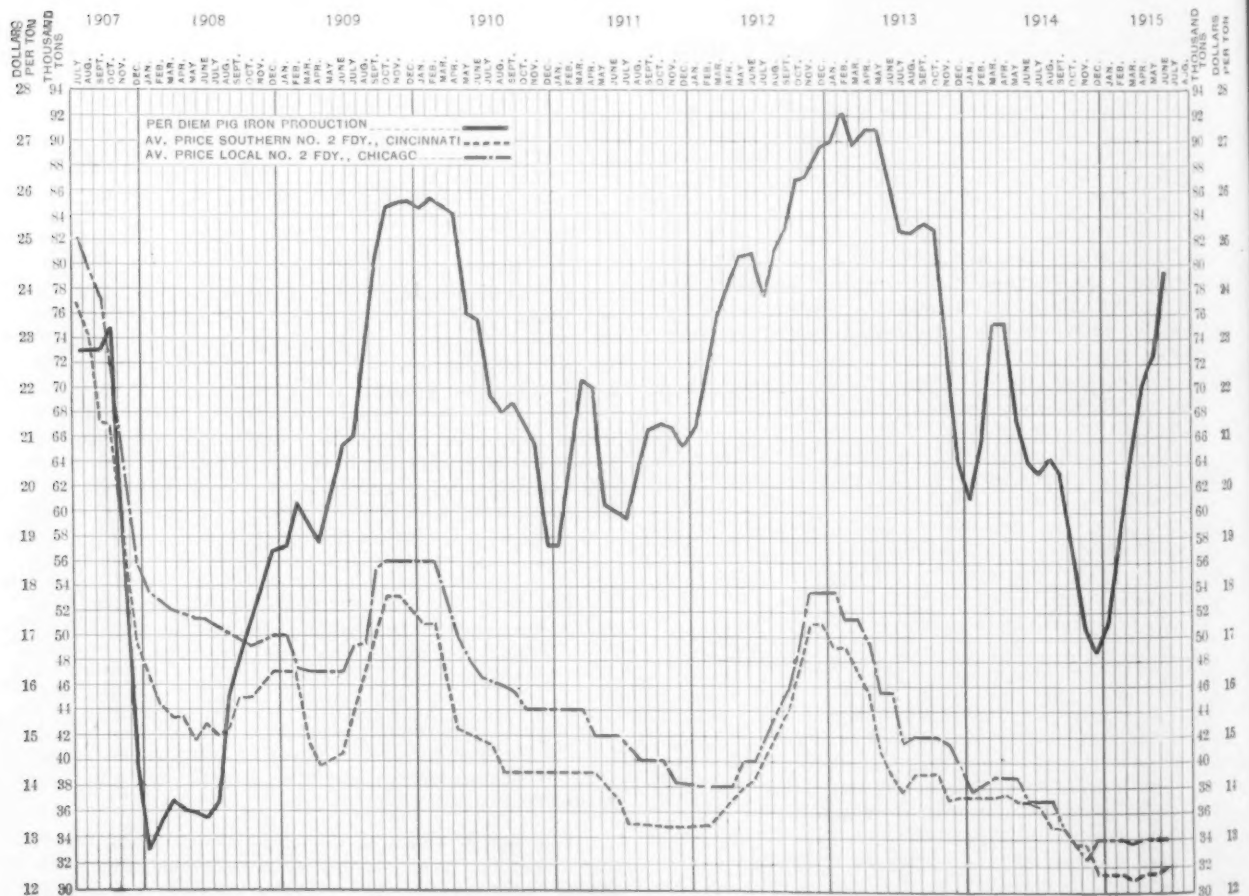


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from July 1, 1907, to July 1, 1915; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

## CAPACITY IN BLAST JULY 1 AND JUNE 1

The following table shows the daily capacity in gross tons of furnaces in blast July 1 and June 1 by districts:

Coke and Anthracite Furnaces in Blast					
Location of furnace	Total number of stacks	Number in blast	Capacity per day	Number in blast	Capacity per day
New York:					
Buffalo	19	14	5,316	14	5,263
Other New York	7	2	424	2	429
New Jersey	7	1	208	1	213
Pennsylvania:					
Lehigh Valley	22	8	2,169	7	1,751
Spiegel	2	2	209	2	211
Schuylkill Val.	15	6	1,821	5	1,669
Lower Susquehanna	7	2	524	2	510
Lebanon Valley	10	2	428	2	390
Pittsburgh Dist.	52	45	20,466	39	18,003
Ferro	4	1	185	1	102
Shenango Val.	19	11	4,425	10	4,281
Western Pa.	24	16	5,087	15	4,662
Spiegel	1	1	130	1	130
Maryland	3	1	515	1	434
Ferro	1	1	51	1	87
Wheeling Dist.	11	8	2,966	7	2,731
Ohio:					
Mahoning Val.	25	21	9,605	22	10,112
Central and Northern	24	14	5,846	14	5,681
Hocking Val. & Hanging Rock	15	5	738	5	711
Ill. and Ind.	34	21	10,520	20	9,984
Ferro	2	1	123	1	32
Michigan, Wis. & Minn.	10	6	1,581	5	1,331
Col. and Mo.	7	2	645	2	626
The South:					
Virginia	24	5	695	5	735
Kentucky	5	1	220	1	240
Alabama	46	17	5,036	17	4,820
Tennessee	20	4	478	4	505
Total	416	218	80,411	206	75,643

Among the furnaces blown in in June were one Bethlehem, one Crane and one Hokendauqua in the Lehigh Valley; one Brooke in the Schuylkill Valley; one Donora, one Clairton, two Edgar Thomson, one Monongahela and one Monessen in the Pittsburgh district; Sharon in the Shenango Valley, one Josephine in western Pennsylvania, Martin's Ferry in the Wheeling district, one South Chicago and one Gary in the Chicago district and one Mayville in Wisconsin.

The furnaces blown out last month were one Bethlehem, which is to be dismantled and rebuilt, and one Lock Ridge in the Lehigh Valley, Mattie in the Mahoning Valley, one Iroquois in the Chicago district and one Oxmoor in Alabama.

## DIAGRAM OF PIG-IRON PRODUCTION AND PRICES

The fluctuations in pig-iron production from July, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE. The figures for daily average production, beginning January, 1908, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1908—Gross Tons

	1908	1909	1910	1911	1912	1913	1914	1915
Jan.	33,918	57,975	84,148	56,752	66,384	90,172	60,808	51,659
Feb.	37,163	60,976	85,616	64,090	72,442	92,369	67,453	59,813
Mar.	39,619	59,232	84,459	70,036	77,591	89,147	75,738	66,575
Apr.	38,289	57,962	82,792	68,836	79,181	91,759	75,665	70,550
May	37,603	60,753	77,102	61,079	81,051	91,039	67,506	73,015
June	36,444	64,656	75,516	59,585	81,358	87,619	63,916	79,361
July	39,287	67,793	69,305	57,841	77,738	82,601	63,150	.....
Aug.	42,851	72,546	67,963	62,150	81,046	82,057	64,363	.....
Sept.	47,300	79,507	68,476	65,903	82,128	83,531	62,753	.....
Oct.	50,554	83,856	67,520	67,811	86,722	82,133	57,361	.....
Nov.	51,595	84,917	63,659	66,648	87,697	74,453	50,611	.....
Dec.	56,158	85,022	57,349	65,912	89,766	63,987	48,896	.....

## THE RECORD OF PRODUCTION

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1911—Gross Tons

	1911	1912	1913	1914	1915
Jan.	1,759,326	2,057,911	2,795,331	1,885,054	1,601,421
Feb.	1,794,509	2,100,815	2,586,337	1,888,670	1,674,771
Mar.	2,171,111	2,405,318	2,763,563	2,347,867	2,063,834
Apr.	2,064,086	2,375,436	2,752,761	2,269,955	2,116,494
May	1,893,456	2,512,582	2,822,217	2,092,686	2,263,470
June	1,787,566	2,440,745	2,628,565	1,917,783	2,380,827
July	1,793,068	2,410,889	2,560,646	1,957,645	.....
Aug.	1,926,637	2,512,431	2,545,763	1,995,261	.....
Sept.	1,997,102	2,463,839	2,505,927	1,882,577	.....
Oct.	2,102,147	2,689,933	2,546,261	1,778,186	.....
Nov.	1,999,433	2,630,854	2,233,123	1,518,316	.....
Dec.	2,043,270	2,782,737	1,983,607	1,515,752	.....

## Blast Furnace Notes

The American Manganese Mfg. Company states that it is now operating a furnace at Dunbar, Pa., on 80 per cent ferromanganese. For some time it has been producing spiegeleisen and has also made ferromanganese of various manganese content ranging from 30 to 70 per cent.

The No. 5 Ensley furnace of the Tennessee Coal, Iron & Railroad Company was scheduled to blow in this week. The Alice furnace of the company, located in Birmingham, is also to go in after being inactive since October, 1913.

The Pittsburgh Crucible Steel Company's blast furnace, located at Midland, Pa., broke all its previous records last month with an output of 15,600 tons in thirty days.

The blast furnace of the Girard Iron Company, Girard, Ohio, was blown out June 30.

The Republic Iron & Steel Company blew out its No. 3 Pioneer furnace at Thomas, Ala., on June 30 for relining. No. 1 furnace had been blown in on June 1, so that all three stacks were active throughout the month.

No. 2 furnace of the LaBelle Iron Works, Steubenville, Ohio, blew out on June 30. The No. 1 furnace blew in June 8.

The Alan Wood Iron & Steel Company, Philadelphia, is preparing to put another furnace at Swedeland, Pa., in blast. It probably will be blown in early in August.

## Lake Iron Ore Shipments in June

The shipments of iron ore brought down the Lakes from the Lake Superior region in June amounted to 6,005,091 gross tons, as compared with 5,502,367 tons in June, 1914. The following table gives the June and season shipments by ports and the corresponding figures for 1914, all in gross tons:

	June, 1914	June, 1915	To July 1, 1914	To July 1, 1915
Escanaba	580,103	720,264	1,076,020	1,248,830
Marquette	262,075	363,637	383,948	547,002
Ashland	541,315	604,127	883,081	1,161,792
Superior	1,997,895	926,536	3,733,502	1,777,600
Duluth	1,045,786	2,146,501	1,779,876	4,295,811
Two Harbors	1,075,193	1,244,026	1,767,689	2,490,248
Total	5,502,367	6,005,091	9,624,116	11,521,283
Increase	.....	502,724	.....	1,897,167

The increase of 502,724 tons for June, 1915, contrasts with a decrease for June, 1914, of 2,472,077 tons. The Duluth percentage to July 1 was 37.28 this year against 18.49 last year, while the Great Northern dock at Superior shipped 13.33 per cent of the total against 37.40 to July 1, 1914.

A 4-in. gas main, 4000 ft. long, was recently welded at Newbern, N. C., with Prest-O-Lite gas and oxygen. The material used was standard National steel line tubing and was sent to the job with the ends beveled and ready for welding. The work was done in the trench, as it was found that faster welds could be made, joints being made in 7 to 10 min. A record of 15 joints with one torch in one afternoon was made, the apparatus being moved a distance of approximately 20 ft. after each weld. Soft steel wire of No. 8 gauge was used as a filling material.

The Barnum Richardson Company, manufacturer of Salisbury charcoal pig iron, is equipping a laboratory at its plant at Lime Rock, Conn., for the particular purpose of analyzing its product. After Aug. 1 Salisbury charcoal pig iron will be sold on a guaranteed analysis. This has not been done heretofore, but has become necessary in meeting the demand for iron for some of the special requirements that have recently developed.

It is stated that the earnings of the Lackawanna Steel Company are growing so rapidly that the profits of the third quarter are expected to wipe out the deficit resulting from operations in the earlier part of the year and show a surplus by Sept. 30.

# The Iron and Metal Markets

## DEMAND AND OUTPUT GROW

### Improvement in Steel Is More Marked

#### Indications of an Active Summer with Prices More Firmly Held

Developments of the week show a further improvement in steel trade conditions and prospects. Increasing production accompanied by increasing demand indicates that the summer months will show no let-down. They may even be marked by activity on a larger scale.

With June the contract period ended on a very considerable volume of business taken at prices from \$1 to \$3 below those now asked and specifications came in freely at the last. Pittsburgh reports that June business in many cases exceeded that of any month in a year, while in the Chicago district, where the improvement in the spring months by no means kept pace with that at Pittsburgh, June bookings were nearly double those of May.

Steel manufacturers are more confident of holding the advanced prices in heavy products and consumers who have had reason to regard some of these rather as helps in dragging the market up from the low levels than as prices to be paid, are more impressed by the fuller taking up of capacity.

The Steel Corporation, as expected, has bought 15,000 tons of steel billets from an Eastern producer to ease up the demand upon its open-hearth departments. Its operating rate has run above 83 per cent of its ingot capacity. Idle Bessemer plants will not be drafted unless the strain is marked. Their cost is high and the call is for open-hearth steel, even where Bessemer might serve.

The pig-iron statistics show plainly the expansion in steel production. In the 30 days of June the output was 2,380,827 gross tons, or 79,361 tons a day, a gain of 6346 tons a day over May. Steel works furnaces contributed nearly 4500 tons of this increase. There was a net gain of 12 in active blast furnaces last month and the capacity of the 218 furnaces in blast July 1 was 80,411 tons a day, against 75,643 tons a day for 206 furnaces one month previous. The country's highest rate of pig-iron output was 92,369 tons a day in February, 1913.

Pig-iron production is now at the rate of 29,500,000 tons a year, against 27,400,000 tons on June 1 and 18,000,000 tons on January 1.

With greater firmness in prices, there is still some irregularity in plates and shapes and even in bars, though a 1.20c. price on the latter is rare. Plates have sold for Western delivery on the basis of 1.15c., Pittsburgh, but 1.20c. has been the usual minimum for shipment east of Pittsburgh.

The leading wire interest has withdrawn jobbers' prices on wire nails below \$1.60 and on plain wire below 1.40c., these prices representing what had been the nominal market for some time. Some of the independent producers have announced the same prices, and there has been a general advance of \$2 on painted and galvanized barb wire and of 25c. per keg in the extra for galvanized nails.

Rail and car business has been relatively quiet. The Rock Island has bought 20,000 tons of rails

and the Omaha has placed 1500 cars for which 10,000 tons of steel has been bought in the Chicago district. British export rails have been quoted as high as \$42.50 at works port.

Bids go in July 16 on 35,000 to 40,000 tons of rails for New York subway systems.

The structural outlook in the West is not particularly promising and but for subway work steel construction in the East would make an indifferent showing. On the Culver elevated section in Brooklyn, requiring 10,000 to 12,000 tons, bids will be taken July 20. Of 15,000 tons just placed in the East 6500 tons was for subways.

The export trade has developed little in the past week. Russia's 200,000 tons or more of standard rails, chiefly 67-lb., are still under negotiation. Wire shipments are large. Steel bar exports, which were 20,000 tons in April, increased to nearly 40,000 tons in May.

There are practically no sellers of billets and sheet bars in the Pittsburgh district, and Youngstown mills are nearly sold up for the third quarter. Prices of open-hearth steel have advanced 50c. to \$1 a ton. Philadelphia reports a sale of 9000 tons of billets to Canada for munition work.

Here and there foundries have been sounding the pig-iron market for deliveries in the first quarter and half of 1916. Sales of Southern iron have been made at \$9.75 and in some cases at \$10 for forward delivery. Malleable foundries in New England and the Philadelphia district are in the market.

With increasing steel output, ferromanganese becomes more important. Domestic production increased in June, also receipts of Brazilian manganese ore. The British ferromanganese situation is still more or less of an enigma, but shipments continue under the stimulus of the \$100 price.

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month and one year previous

	July 7, 1915.	June 30, 1915.	June 9, 1915.	July 8, 1914.
<b>Pig Iron, Per Gross Ton:</b>				
No. 2 X, Philadelphia....	\$14.25	\$14.25	\$14.25	\$14.75
No. 2, Valley furnace....	<b>12.75</b>	12.50	12.75	13.00
No. 2 Southern, Cin'ti....	12.65	12.65	12.40	13.25
No. 2, Birmingham, Ala.	9.75	9.75	9.50	10.00
No. 2, furnace, Chicago*	13.00	13.00	13.00	13.75
Basic, del'd, eastern Pa...	13.75	13.75	13.50	14.00
Basic, Valley furnace....	12.65	12.65	12.50	13.00
Bessemer, Pittsburgh....	14.70	14.70	14.70	14.90
Malleable Bess., Ch'go*	13.00	13.00	13.00	14.00
Gray forge, Pittsburgh...	<b>13.45</b>	13.35	13.45	13.65
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.75

<b>Billets, etc. Per Gross Ton:</b>				
Bess. billets, Pittsburgh...	20.50	21.00	20.00	19.00
O.-h. billets, Pittsburgh...	<b>21.50</b>	21.00	20.00	19.00
O.-h. sheet bars, P'gh....	22.00	22.00	21.00	20.00
Forging billets, P'gh....	27.00	27.00	26.00	25.00
O.-h. billets, Phila....	<b>24.50</b>	22.02	22.02	21.90
Wire rods, Pittsburgh...	<b>25.50</b>	25.00	25.00	24.50

<b>Finished Iron and Steel,</b>				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.22 1/2	1.22 1/2	1.17 1/2	1.17 1/2
Iron bars, Pittsburgh....	1.25	1.25	1.25	1.25
Iron bars, Chicago....	1.20	1.20	1.20	1.00
Steel bars, Pittsburgh...	1.25	1.25	1.20	1.10
Steel bars, New York...	1.419	1.419	1.369	1.26
Tank plates, Pittsburgh.	1.20	1.20	1.15	1.10
Tank plates, New York..	1.369	1.369	1.319	1.26
Beams, etc., Pittsburgh..	<b>1.25</b>	1.20	1.20	1.10
Beams, etc., New York..	<b>1.419</b>	1.369	1.369	1.26
Skelp, grooved steel, P'gh	1.15	1.15	1.15	1.15
Skelp, sheared steel, P'gh	1.20	1.20	1.20	1.20
Steel hoops, Pittsburgh..	1.30	1.30	1.30	1.25

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.



	July 7, 1915.	June 30, 1915.	June 9, 1915.	July 8, 1914.
<b>Sheets, Nails and Wire.</b>				
Per lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.75	1.75	1.75	1.80
Galv. sheets, No. 28, P'gh.	4.50	4.50	4.50	2.75
Wire nails, Pittsburgh.	1.00	1.55	1.55	1.50
Cut nails, Pittsburgh.	1.55	1.55	1.55	1.55
Fence wire, base, P'gh.	1.40	1.35	1.35	1.30
Barb wire, galv., P'gh.	2.50	2.40	2.40	1.90

<b>Metals.</b>				
Per lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	22.50	22.50	22.50	14.00
Electrolytic copper, N. Y.	19.75	20.00	19.62 1/2	13.75
Spelter, St. Louis.	21.50	21.00	26.00	4.85
Spelter, New York.	22.00	21.50	26.50	5.00
Lead, St. Louis.	5.02 1/2	5.60	5.87 1/2	3.75
Lead, New York.	5.75	5.75	6.00	3.90
Tin, New York.	39.25	40.00	40.00	32.00
Antimony, Asiatic, N. Y.	36.75	36.25	26.00	5.40
Tin plate, 100-lb. box, P'gh.	\$3.10	\$3.10	\$3.10	\$3.30

<b>Coke, Connellsville, Per Net Ton at Oven:</b>				
Furnace coke, prompt.	\$1.75	\$1.60	\$1.50	\$1.75
Furnace coke, future.	1.75	1.75	1.65	1.85
Foundry coke, prompt.	2.00	2.00	2.00	2.30
Foundry coke, future.	2.25	2.25	2.25	2.40

<b>Old Material, Per Gross Ton:</b>				
Iron rails, Chicago.	12.25	12.25	12.25	12.25
Iron rails, Philadelphia.	15.00	15.00	15.00	15.00
Carwheels, Chicago.	11.00	10.75	10.00	11.25
Carwheels, Philadelphia.	12.00	11.50	11.50	11.00
Heavy steel scrap, P'gh.	11.75	11.75	11.75	11.50
Heavy steel scrap, Phila.	11.50	11.25	11.00	10.50
Heavy steel scrap, Ch'go.	10.25	9.75	9.50	9.75
No. 1 cast, Pittsburgh.	12.25	12.25	12.00	11.50
No. 1 cast, Philadelphia.	12.25	12.25	12.25	12.00
No. 1 cast, Ch'go (net ton)	9.25	9.00	9.00	9.75

## Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal has no stability, being dependent on vessel charges.

**Plates.**—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.20c. base net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 6, 1903, or equivalent, 1/4 in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 1/4 in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under 1/4 in. to and including 3-16 in.	.10
Gages under 3-16 in. to and including No. 8.	.15
Gages under No. 8 to and including No. 9.	.25
Gages under No. 9 to and including No. 10.	.30
Gages under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates), 3 ft. and over.	.10
Complete circles, 3 ft. in diameter and over.	.20
Boiler and flange steel.	.10
"A. B. M. A." and ordinary firebox steel.	.20
Still bottom steel.	.30
Marine steel.	.40
Locomotive firebox steel.	.50
Widths over 100 in. up to 110 in., inclusive.	.05
Widths over 110 in. up to 115 in., inclusive.	.10
Widths over 115 in. up to 120 in., inclusive.	.15
Widths over 120 in. up to 125 in., inclusive.	.25
Widths over 125 in. up to 130 in., inclusive.	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive.	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive.	.50
Cutting to lengths under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

**Wire Products.**—Prices to jobbers. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, \$1.40; galvanized, \$2.20. Galvanized barb wire and staples, \$2.50; painted, \$1.70. Wire nails, \$1.60. Galvanized nails, 1 in. and longer, \$1.75 advance over base price; shorter than 1 in., \$2.25 advance over base price. Woven wire fencing, 69 per cent off list for carloads; 68 off for 1000-rod lots; 67 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12	12½	13	14	15	16
Annealed	....\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10	
Galvanized	.. 2.35	2.40	2.45	2.50	2.60	2.70	3.00	3.10	

**Wire Rods.**—Bessemer, open-hearth and chain rods, \$25.50.

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, 3 in. and over, 1.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles.	.30
Handrail tees.	.75
Cutting to lengths under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from June 17, 1915, all full weight:

Butt Weld					
Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4, 1/2 and 3/4	72	40 1/2	1/4 and 1/2	64	31
1/2	76	53 1/2	3/4	64	31
3/4 to 3	79	57 1/2	1 1/2	68	41
			3/4 to 2 1/2	71	46
Lap Weld					
2	76	54 1/2	1 1/4	55	30
2 1/2 to 6	78	56 1/2	1 1/2	66	41
7 to 12	76	54 1/2	2	67	43
13 and 14	62 1/2		2 1/2 to 4	69	46
15	60		4 1/2 to 6	69	46
			7 to 12	67	46
Reamed and Drifted					
1 to 3, butt.	77	55 1/2	1 to 1 1/2, butt.	69	44
2, lap	74	52 1/2	2, butt	69	44
2 1/2 to 6, lap.	76	54 1/2	1 1/4, lap	53	28
			1 1/2, lap	64	39
			2, lap	65	41
			2 1/2 to 4, lap.	67	44
Butt Weld, extra strong, plain ends					
1/4, 1/2 and 3/4	67	43 1/2	3/4	61	37
1/2	72	52 1/2	1 1/2	66	45
3/4 to 1 1/2	76	56 1/2	3/4 to 1 1/2	70	47
2 to 3	77	57 1/2	2 and 2 1/2	71	48
Lap Weld, extra strong, plain ends					
2	73	51 1/2	1 1/2	65	42
2 1/2 to 4	75	53 1/2	2	67	43
4 1/2 to 6	74	52 1/2	2 1/2 to 4	69	46
7 to 8	68	46 1/2	4 1/2 to 6	68	45
9 to 12	63	41 1/2	7 to 8	61	40
			9 to 12	56	35
Butt Weld, double extra strong, plain ends					
1/2	62	42 1/2	1 1/2	56	34
3/4 to 1 1/2	65	45 1/2	3/4 to 1 1/2	59	37
2 to 2 1/2	67	47 1/2	2 and 2 1/2	61	39
Lap Weld, double extra strong, plain ends					
2	63	43 1/2	2	57	34
2 1/2 to 4	65	45 1/2	2 1/2 to 4	59	39
4 1/2 to 6	64	44 1/2	4 1/2 to 6	58	38
7 to 8	58	36 1/2	7 to 8	51	29

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

**Boiler Tubes.**—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, in effect from June 15, 1915, are as follows:

<i>Lap Welded Steel</i>		<i>Standard Charcoal Iron</i>	
1 1/4 and 2 in.....	64	1 1/4 and 2 in.....	51
2 1/4 in.....	61	2 1/4 in.....	48
2 1/2 to 2 3/4 in.....	67	2 1/2 and 2 3/4 in.....	55
3 and 3 1/4 in.....	72	3 and 3 1/4 in.....	59
3 1/2 and 4 1/2 in.....	73	3 1/2 and 4 1/2 in.....	61
5 and 6 in.....	66	5 and 6 in.....	55
7 to 13 in.....	63		

Locomotive and steamship special charcoal grades bring higher prices.

1 1/4 in., over 18 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

**Sheets.**—Makers' prices for mill shipment on sheets of U. S. Standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots

from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent cash discount in 10 days from date of invoice:

Blue Annealed Sheets		Cents per lb.
Nos. 3 to 8.....		1.25 to 1.30
Nos. 9 to 10.....		1.30 to 1.35
Nos. 11 and 12.....		1.35 to 1.40
Nos. 13 and 14.....		1.45 to 1.50
Nos. 15 and 16.....		1.55 to 1.60

Box Annealed Sheets, Cold Rolled		Cents per lb.
Nos. 10 and 11.....		1.40 to 1.45
No. 12.....		1.40 to 1.45
Nos. 13 and 14.....		1.45 to 1.50
Nos. 15 and 16.....		1.50 to 1.55
Nos. 17 to 21.....		1.55 to 1.60
Nos. 22 and 24.....		1.60 to 1.65
Nos. 25 and 26.....		1.65 to 1.70
No. 27.....		1.70 to 1.75
No. 28.....		1.75 to 1.80
No. 29.....		1.80 to 1.85
No. 30.....		1.90 to 1.95

Galvanized Sheets of Black Sheet Gage		Cents per lb.
Nos. 10 and 11.....		3.50 to 4.00
No. 12.....		3.60 to 4.10
Nos. 13 and 14.....		3.60 to 4.10
Nos. 15 and 16.....		3.70 to 4.20
Nos. 17 to 21.....		3.85 to 4.35
Nos. 22 and 24.....		4.05 to 4.55
Nos. 25 and 26.....		4.20 to 4.70
No. 27.....		4.35 to 4.85
No. 28.....		4.50 to 5.25
No. 29.....		5.25
No. 30.....		5.50

## Pittsburgh

PITTSBURGH, PA., July 6, 1915.

June bookings were very satisfactory to all the steel mills, and in many cases exceeded those in any month since June a year ago. The first few days of July have brought exceptionally heavy bookings as a whole, since there were many contracts expiring June 30 at prices below what can now be done in the market, and buyers specified very freely at the last moment. The mills are feeling in much stronger position than at any previous time in this movement, and are confident that prices will continue to stiffen, and in still more marked fashion than in the past few months. They expect, for instance, that before the end of August bars, plates and shapes will be firm on the basis of 1.30c., Pittsburgh, though in plates the market is not yet well established at 1.25c. The summer does not promise to be a dull one in the steel trade, as it usually is. Mill operations continue to increase, and many plants are operating practically at capacity. The Carnegie Steel Company is operating all its steel plants except the Columbus works, nearly all of them in full. At the Edgar Thomson plant production is heavier than for a long time, only four open-hearth furnaces being off, while the Bessemer department is running quite well, and a moderate tonnage of ingots is being shipped to other works, where there is soaking pit capacity to spare. The Columbus works will not be started in the near future, as it makes only Bessemer billets and sheet bars, and some additional steel can still be secured from the Gary works, and if still more steel is needed the Riverside works of the National Tube Company can be started to make billets and sheet bars. At a time when wire products are usually the dullest advances are being made, the mills being busy on account of export demand.

**Pig Iron.**—The three or four furnaces in western Pennsylvania and the Mahoning Valley that have lately been willing to sell foundry and malleable at \$12.50, Valley basis, have withdrawn this quotation, and are now quoting on the basis of \$12.75, at which price several odd lots of foundry and malleable, totaling about 2000 tons, have been sold in the past few days. Holders of Bessemer and basic iron are quite firm in their views as a rule, and some of them are holding their iron at well above the ordinary quotations. W. P. Snyder & Co. report the average prices of Bessemer and basic iron in June, as computed from actual sales of Valley iron in lots of 1000 tons and over, at \$13.75 for Bessemer, an increase of 9.1c. over the May average, and at \$12.75 for basic, an increase of 7.4c. over May. About 15,000 tons entered into the computation for June in each case. The basic average was pulled up by the fact that a considerable tonnage was entered at

\$12.80, for delivery over the remainder of the year. We quote: Bessemer iron, \$13.75; malleable, \$12.75; No. 2 foundry, \$12.75; basic, \$12.65 for July and August and \$12.75 to \$12.80 for delivery over second half of the year; gray forge, \$12.50, all at Valley furnace, with a freight rate of 95c. per ton for delivery in the Pittsburgh district.

**Billets and Sheet Bars.**—The Carnegie Steel Company has bought some open-hearth billets in the East to apply against some of its early obligations, and will hardly buy any additional tonnage for the present. There are practically no sellers of billets and sheet bars in the Pittsburgh district, and the Youngstown mills are quite reserved about selling, reporting that they are nearly sold up already for the current quarter. While Bessemer steel is not quotably higher, quotations on open-hearth steel have advanced rather sharply, and there is now a spread of 50c. to \$1 a ton between the two classes of steel. Quotations are on the basis of a 50c. differential between billets and sheet bars. There being practically no quotations from Pittsburgh mills, the Pittsburgh market is made by the Valley quotations, at about \$1 a ton higher, the actual freight being \$1.05. We quote, f.o.b. maker's mill, Youngstown: Bessemer billets, \$19.50 to \$20; Bessemer sheet bars, \$20 to \$20.50; open-hearth billets, \$20.50; open-hearth sheet bars, \$21. Delivered Pittsburgh: Bessemer billets, \$20.50 to \$21; Bessemer sheet bars, \$21 to \$21.50; open-hearth billets, \$21.50; open-hearth sheet bars, \$22. Forging billets are quoted at \$27 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and lighter carbons. Foreign billets running above 0.25 and up to 0.60 carbon take \$1 per ton extra. Axle billets are held at \$24.

**Ferroalloys.**—A few relatively small contracts have lately been closed for English ferromanganese for forward delivery at \$100, seaboard, the buyers being consumers who still have considerable tonnage due them against much lower priced contracts. Small lots for shipment out of stock continue to bring \$105 and higher. We quote 50 per cent ferrosilicon in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72, and over 600 tons, \$71, delivered in the Pittsburgh district. We quote 10 per cent ferrosilicon at \$17; 11 per cent, \$18; 12 per cent, \$19, all f.o.b. cars at furnace Ashland, Ky., Jackson, or New Straitsville, Ohio, each of these points having a rate to Pittsburgh of \$2 per gross ton. We quote 20 per cent spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads 10c. in 2000-lb. lots and over, and 12½c. in smaller lots.

**Structural Material.**—The American Bridge Company has been awarded the contract for the western approaches to the St. Louis bridge, requiring upward of 24,000 tons. While the shape tonnage reaching the mills is not large, it is increasing at a fair rate. The mills are fairly firm at 1.25c., Pittsburgh, for prompt and third quarter, while some of them are beginning to quote 1.30c. on fourth quarter contracts and express the belief that the market will be at this figure as minimum before two months have elapsed. We quote the market at 1.25c. for beams and channels, 15-in. and under.

**Plates.**—It is reported that the Baltimore & Ohio, New York Central and Erie will all put out definite inquiries shortly for a considerable number of the new type of heavy car, with 70 tons carrying capacity, as they have been sounding the market quietly since the recent Pennsylvania purchases of these heavy cars. The smaller mills that were quoting so much below the large mills are rapidly firming up, and are sometimes quoting 1.25c., the price to which the large mills are adhering fairly well. We quote plates ¼-in. and heavier at 1.20c. to 1.25c., Pittsburgh.

**Steel Rails.**—The Carnegie Steel Company has entered the Pennsylvania rail tonnage on books, and will begin rolling the 100-lb. section at Edgar Thomson this month, while some of the 125-lb. rails will be rolled next month. Light rail tonnage continues fairly good. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and



10-lb. sections, 1.275c.; 12 and 14-lb., 1.225c.; 16 and 20-lb., 1.175c.; 25, 30, 35, 40, and 45-lb. sections 1.125c. The price of light rails are materially shaded on large lots.

**Tin Plate.**—Specifications on contracts with the domestic trade are fair for the season but new demand continues light. The export demand is the heaviest ever experienced, and several producers have booked round tonnages for export, with more in sight. Prices on export business are slightly better than they were a few weeks ago, but as a rule are not much above \$3.05 when the buyer arranges to pay in New York funds and takes care of the ocean transportation. The leading interest last week booked an order for 100,000 boxes for export, and already this week has booked an order for 50,000 boxes, both orders involving oil sizes and calling for early deliveries, some shipments being made this week from stock. Operations are well maintained at about 95 per cent of capacity. On new orders we quote 14 x 20 coke plates at \$3.10 to \$3.25 per base box, but on a very desirable order for delivery ahead the \$3.10 price might be shaded, but not over 5c. or 10c. per box.

**Sheets.**—Demand for black and blue annealed sheets continues very good, and in the sheet trade as a whole it averages up fairly well, despite the light demand for galvanized sheets caused by the high prices. Galvanized sheet prices on a given gage are fairly uniform, but as the old differentials between gages do not fit with the high cost of spelter various base prices are quoted according to the gage to which they are intended to apply. For 30-gage, for instance, mills would quote 5.25c. basis, with a differential of 0.25c. for 30-gage, making 30-gage 5.50c. net, while for 28-gage alone they would quote about 5c., and on heavy gages they would quote down to a basis of about 4.50c. Blue annealed sheets are firming up, and it is stated that about as much is sold at 1.35c. as at 1.30c. Sales of black sheets from miscellaneous stocks are being made at 1.70c. or even less, but regular deliveries are generally bringing 1.75c. to 1.80c. The automobile trade is buying freely of body, hood and fender stock as well as of blue annealed, and some good specifications have already been received. Corrugated sheets are being quoted on the basis of 1.70c. to 1.75c. with the usual 0.20c. extra for corrugating and painting. We quote No. 28 Bessemer black sheets at 1.75c. to 1.80c.; No. 28 galvanized, 4.50c. to 5.25c.; Nos. 9 and 10 blue annealed sheets, 1.30c. to 1.35c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26, and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

**Wire Rods.**—The wire mills are substantially as busy now as they usually are at the height of the season, and as their surplus rod production is already fairly well taken up they are quoting higher prices or are out of the market altogether. We quote Bessemer, open-hearth, and chain rods at \$25.50 to \$26 for domestic, while \$26 or higher is being asked by mills that can quote for foreign delivery.

**Carwheels.**—Makers of steel wheels are moderately busy, chiefly on wheels required for cars now being built. We quote standard 33-in. freight carwheels, 6½ in. rough bore, at \$16, and standard 36-in. passenger, the same bore, at \$22.50 per wheel, f.o.b., Pittsburgh.

**Shafting.**—Consumers are well covered by contracts, and are specifying so freely that producers are quite busy and nearly all are quoting the advanced prices recently put out by leading producers, namely, 66 per cent off in carload and larger lots and 61 per cent in less than carloads, f.o.b., Pittsburgh.

**Railroad Spikes.**—The spike makers are quite busy, specifications on contracts having come with rather a rush and an early advance in the market is predicted. We quote standard sizes of railroad spikes at \$1.40 and small railroad and boat spikes at \$1.50 per 100 lb., f.o.b., Pittsburgh.

**Hoops and Bands.**—The hoop mills are at last well filled and are adhering to 1.30c., base, though contracts

now being filled are as a rule at not over 1.25c. Bands are firm at 1.25c., their strength being due largely to the firmness in merchant bars. We quote steel bands at 1.25c. for delivery in the third quarter and last half, with extras as per the steel bar card, and steel hoops at 1.30c., f.o.b., Pittsburgh.

**Wire Products.**—Under date of June 30 the American Steel & Wire Company notified the trade that its prices would be as follows: Plain wire, 1.40c.; wire nails, \$1.60; painted barb wire, 1.70c.; galvanized barb wire, 2.50c.; extra for galvanizing plain wire, 80c. per 100 lb.; extra for galvanized nails, 1 in. and longer, \$1.75. These prices represent a restoration of the prices on plain wire and nails that had recently gone by the board, though not officially withdrawn, an advance of \$2 per ton on both painted and galvanized barb wire, and an advance of 25c. per keg in the extra for galvanized nails. The independents have been adopting the new prices and the market is now fairly firm on the new level. It is understood that jobbers have been given protection at lower than the new prices, but hardly to the same extent as usual. The stiffening in wire prices comes at the time of year when the market is usually quite soft, and is due entirely to the continued heavy demand for export. We quote plain annealed wire at \$1.40; galvanized barb wire and fence staples, \$2.50; painted barb wire, \$1.70; all f.o.b., Pittsburgh, with freight added to point of delivery, terms 30 days net, less 2 per cent off for cash in 10 days. Woven wire fencing is quoted at 69 per cent off in carload lots, 68 per cent on 1000-rod lots, and 67 per cent on small lots, f.o.b., Pittsburgh.

**Skelp.**—The market for skelp is fairly active, and is being stiffened by the stronger position of merchant bars and plates. We quote grooved steel skelp at 1.15c. to 1.20c.; sheared steel skelp, 1.20c. to 1.25c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., delivered to consumers' mills in the Pittsburgh district. The minimum prices quoted above would be named only on very desirable orders and for regular sizes.

**Iron and Steel Bars.**—The market on steel bars is very firm indeed, there being a fair run of general trade, while the demand for large rounds is insistent. The rail mills are already making shrapnel rounds—the Ohio works at Youngstown and the Edgar Thomson works of the Carnegie Steel Company—while it is understood that the Ensley rail mill will soon be making some of this product also. The mills are quite firm at 1.25c. for third quarter or second half, and have already quoted 1.30c. for fourth quarter in some instances, while predictions are made that before the end of next month the whole market will be 1.30c. Iron bars continue in relatively poor demand. We quote steel bars at 1.25c. for third quarter; common iron bars made from part scrap, 1.25c. to 1.30c., and test-iron bars at 1.35c. to 1.40c., f.o.b., Pitts' urgh.

**Rivets.**—Specifications on rivet contracts are increasing, and some new business is also being booked, giving the market a firm tone. We quote structural rivets at \$1.50, and conehead boiler rivets at \$1.60 per 100 lb. in carload lots, f.o.b., Pittsburgh, smaller lots bringing from 5c. to 10c. advance, depending on the order.

**Cold Rolled Strip Steel.**—The \$2 advance on cold rolled strip steel is being well maintained, the mills being fairly busy. We quote hand-rolled steel, 1½ in. and wider, under 0.20 carbon, sheared or natural mill edge, per 100 lb., \$2.85, delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	\$0.25	\$0.10
0.099 to 0.050	\$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only



**Merchant Steel.**—Demand continues fairly active, making a favorable comparison with 30 or 60 days ago. Prices in small lots are as follows: Iron finished tire,  $\frac{1}{2}$  x  $1\frac{1}{2}$  in. and larger, 1.40c., base; under  $\frac{1}{2}$  x  $1\frac{1}{2}$  in., 1.55c.; planished tire, 1.60c.; channel tire,  $\frac{3}{4}$  to  $\frac{1}{2}$  in. and 1 in., 1.90c. to 2c.;  $1\frac{1}{2}$  in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c.

**Nuts and Bolts.**—Specifications are good on contracts, and makers are busier than at any time for about a twelve-month. Prices are stated to be firm, discounts to the large trade being as follows:

*U. S. S. Cold Punched Blank and Tapped, Chamfered, Trimmed and Reamed*

$\frac{1}{2}$  in. and smaller, hex. .... 8.1c. per lb. off  
 $\frac{3}{8}$  in. and larger, hex. .... 7.3c. per lb. off  
 Square, all sizes .... 5.8c. per lb. off

*Semi-Finished Tapped*

$\frac{1}{2}$  in. and smaller hex. .... 8.5-10-10 off  
 $\frac{3}{8}$  in. and larger hex. .... 8.5-10-10 off

*Black Bulk Rivets*

7/16 x  $6\frac{1}{2}$ , smaller and shorter .... 8.0-10-5 off

*Package Rivets 1000 Pcs.*

Black, metallic tinned and tin plated .... 7.5-10-10 off

Discounts on bolts as recently adopted are as follows:

Common carriage bolts,  $\frac{3}{4}$  x 6, S & S rolled, 80-5; cut, 80; larger or longer, 75-5. Machine bolts, h. p. nuts,  $\frac{3}{4}$  x 4, S & S rolled, 80-5; cut, 80; larger or longer, 75-2/10. Machine bolts with C. P. & C & T nuts,  $\frac{3}{4}$  x 4, S & S, 75-2/10; larger or longer, 75. Bolts without nuts, 6 in. and shorter extra 10%; longer lengths, extra 5%. G. P. coach screws, 75-2/10-5. Nuts, blank or tapped, h. p. square, 6.20; hexagon, 7.10. C. P. C & T square, 5.80; hex.  $\frac{5}{8}$  in. and up, 7.30; smaller, 8.1. C. P. plain, square, 5.30; hexagon, 5.70. C. P., semi-fin. hex.,  $\frac{5}{8}$  and up, 8.5-3/10; smaller, 8.5-2/10.

**Wrought Pipe.**—Demand for merchant pipe continues quite satisfactory, and is as heavy now as it was in June. There is no improvement in demand for oil country goods, and the pipe mills have no hope of running full until there is at least a moderate improvement in this direction. Operations are now at about 75 per cent of capacity.

**Boiler Tubes.**—Demand for boiler tubes continues quite satisfactory, and the improvement as compared with 60 days ago is quite marked. Discounts on iron and steel boiler tubes are reported as being firmly maintained.

**Old Material.**—The market continues quiet. The steel mills are making only occasional purchases, and then only in relatively small lots. The iron foundries and the rolling mills continue to be poor buyers, taking only small lots. Turnings are feeling still more the pressure of heavy production, due to the large amount of shrapnel being made, and dealers' bids have gone down, while there are sellers of round lots to consumers at \$8, as against quotations of \$8.25 to \$8.50 last week. Quotations otherwise are unchanged. For delivery in Pittsburgh and nearby districts that take Pittsburgh freights, dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$11.75 to \$12.00
Compressed side and end sheet scrap	11.75 to 12.00
No. 1 foundry cast	12.25 to 12.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.25 to 9.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.50 to 10.75
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	15.25 to 15.50
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 bushelling scrap	10.25 to 10.50
No. 2 bushelling scrap	7.25 to 7.50
Machine shop turnings	8.00
Old carwheels	11.75 to 12.00
Cast-iron borings	8.75 to 9.00
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

\*Shipping point.

**Coke.**—While some producers of coke made an effort to forestall the scarcity that usually occurs over the national holiday, by increasing shipments slightly in the past fortnight, there has been an extra demand for furnace coke for spot shipment, and \$1.75 was ob-

tained last Friday and Saturday. To-day there is little inquiry, but the market is still at that figure, though it will probably drop within a few days. No interest is being manifested in furnace coke for extended delivery. All the independent coke producers that had reduced wages last year have now returned to the Frick scale. We quote prompt furnace coke at \$1.75, and contracts to Jan. 1 at the same figure. We quote best makes of 72-hr. foundry coke for prompt shipment at \$2 to \$2.25, and on contracts from \$2.25 to \$2.50 per net ton at oven. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ended June 26 as 355,478 net tons, an increase over the previous week of 6968 tons.

## Chicago

CHICAGO, ILL., July 7, 1915—(By Wire).

Steel mill bookings are increasing with each week. The month of June practically doubled May in tonnage. At the Gary works all of the blast furnaces are in operation and thirty-two out of forty-two open-hearth furnaces, with more to go on at once. At the South works six out of eleven blast furnaces are making iron, No. 2 open hearth is in full operation and No. 1 open hearth has been started. In the finishing departments the bar mills are operating at capacity at all of the Steel Corporation's works and at the Indiana Harbor mill capacity is sold up for at least two months. With respect to structural steel a similar situation is being approached. Improvement in plates is to be noted, but it comes more slowly. Sheet mill operations are still about as they have been, but with a returning disposition on the part of the trade to accept conditions affecting galvanized this department promises to improve as available stocks of sheets are exhausted. In addition to the 24,000 tons of bridge steel at St. Louis, and approximately 10,000 tons for the Omaha cars, there was placed in miscellaneous contracts last week about 3000 tons, with an additional 2000 tons in sight. Rail business included 20,000 tons from the Rock Island and other orders aggregating 5000 tons, together with liberal specifications from three of the Western trunk lines. Prices are firmer in proportion to the improvement in bookings, with advances in spikes and track bolts and wire. Higher prices are being asked for scrap. Pig iron is temporarily quiet.

**Pig Iron.**—Except for a scattering inquiry, in which nothing exceeding 1000 tons is reported, the market has again resumed a lean and quiet aspect. A renewal of buying for the fourth quarter in particular is expected at any time, both by founders who have as yet bought nothing, and others whose requirements have been only partially covered. The several lots of malleable iron which have been up for figures in the past fortnight have been placed, and the negotiations covering a large tonnage of charcoal iron for delivery at South Bend, Ind., culminated last week. It is understood that a northern Michigan furnace took this business, making such concessions as would equalize freight rates. Transactions in Southern iron have not been sufficiently numerous to occasion any real activity. Ability to secure Southern iron on the basis of \$9.50, Birmingham, for No. 2 is again being claimed by buyers, but the market displays firmness at \$9.75. For local iron the market continues firmly at \$13 at furnace. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. a ton.

Lake Superior charcoal, Nos. 2 to 5	\$15.75
Lake Superior charcoal, No. 1	16.25
Lake Superior charcoal, No. 6 and Scotch	16.75
Northern coke foundry No. 1	\$13.50 to 13.75
Northern coke foundry, No. 2	13.00 to 13.50
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	14.25 to 14.50
Southern coke, No. 2 f'dry and 2 soft	13.75 to 14.00
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	16.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 8 per cent	16.50 to 17.00
Jackson Co. and Ky. silv'y, 10 per cent	17.50 to 18.00

**Rails and Track Supplies.**—Only the most desirable business in track fastenings can now be placed at inside figures, advances being asked for less than carload busi-

ness. New rail orders include 20,000 tons from the Rock Island, and miscellaneous purchases aggregating 5000 tons. Specifications against contracts are coming in freely. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, \$23.25 to \$24.25, 12 lb. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base, open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

**Structural Material.**—The outlook for tonnage in structural steel building projects is not particularly promising. There are perhaps a dozen small jobs in sight aggregating 2000 tons, of which the largest are a bank and store building at South Bend, Ind., for which 425 tons will be required, and an apartment building in Chicago involving about 300 tons. Of the business taken last week that awarded to the American Bridge Company is most conspicuous. This company will fabricate 500 tons of girder spans for the Burlington Railroad, 180 tons for the Pullman Company, 300 tons for a bridge in California, and about 250 tons for other work. The new factory of the Keystone Steel & Wire Company, Peoria, Ill., went to the Decatur Bridge Company, and the new University of Illinois buildings to the King Bridge Company. The Paxton & Vierling Iron Works, Omaha, will furnish 570 tons for an apartment building in that city, and A. Bolter Sons 179 tons for a high school building at Fairmont, Minn. Formal award of the 24,000 tons for the St. Louis bridge is expected to be made to-morrow to the American Bridge Company. With respect to new cars, there have been no developments beyond the placing of 1500 by the Omaha, equally divided between the American Car & Foundry Company and Haskell & Barker Car Company. The 2000 cars each for the Baltimore & Ohio and the Burlington, together with the inquiry from the Chicago Great Western, are still unplaced. In connection with structural steel specifications the market is as much improved as in any other direction, and prices are firm. We quote for Chicago delivery of structural steel from mill, 1.389c. to 1.439c.

Store business shows an increase both in number of sales and volume. The local jobbers look to the rapid extension of mill deliveries to bring a still more marked increase in buying from stock. We continue to quote from store 1.75c.

**Plates.**—Although the mills have for the first time in many months a reasonable leeway in the bookings of plates ahead of them, there remains in this market the evidence of the desirability of further plate tonnage. Users are still claiming purchases at 1.10c., Pittsburgh, and there is little doubt that 1.15c. is being done for early shipment. The leading interest has taken some further orders of plates for export. We quote for Chicago delivery of plates from mill 1.339c.

We quote for Chicago delivery of plates out of stock 1.75c.

**Sheets.**—Users of galvanized sheets are gradually approaching the point of willingness to accept current prices and to use this material on a conservative scale. There is not likely to be any marked resumption of selling by the mills, however, until stocks of galvanized sheets in warehouses and elsewhere become exhausted, as galvanized sheets out of store are still selling at lower prices than are warranted at the mill under existing conditions. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.939c.; No. 28 galvanized, 5.15c. to 5.439c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 4.85c.

**Bars.**—The scaling down of inventories by implement interests has left them with very small stocks and it is acknowledged that manufacturing will be resumed much earlier this year than usual. Recent liberal specifications bear this out. For hard steel bars there is some slight improvement, but the great reduction in exports of agricultural machinery have much reduced the demand for hard steel. There is no improvement in the available tonnage of bar iron, though the price continues decidedly firm. We quote for mill shipment as follows: Bar iron, 1.20c.; soft steel bars,

1.389c.; hard steel bars, 1.20c.; shafting, in carloads, 65 to 68 per cent off; less than carloads, 60 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c., base, with 5c. extra for twisting in sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting 60 per cent off, and in carloads, 62 per cent off.

**Rivets and Bolts.**—Nut and bolt specifications are being received in increasing volume, and Western makers are operating comfortably. A large proportion of rivet users are now under cover and the price is being fairly well maintained. Quotations are as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-15; machine bolts up to  $\frac{3}{4}$  x 4 in., rolled thread, with hot pressed square nuts, 80-15; cut thread, 80-10; larger sizes, 80; gimlet point coach screws, 85; hot pressed nuts, square, \$6.40 off per cwt.; hexagon, \$7.30 off per cwt. Structural rivets,  $\frac{3}{4}$  to  $1\frac{1}{4}$  in., 1.65c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2c.; boiler rivets, 2.10c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to  $\frac{3}{4}$  x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square, \$6, and hexagon, \$6.70 off per cwt.

**Wire Products.**—Prices of wire and wire nails have been advanced, and buying, particularly of wire nails, for some time deferred, appears to have revived in a season normally dull, but some reports would indicate that there is still a scarcity of wire-nail business. We quote per 100 lb.: Wire nails, \$1.789; painted barb wire, \$1.889; galvanized barb wire, \$2.689; polished staples, \$1.889; galvanized staples, \$2.689.

**Cast-Iron Pipe.**—A number of small contractors' jobs are about to be let, none of which involves over 100 tons, but, aside from the larger awards previously mentioned to be placed this week and next, the only lettings of importance are 700 tons at Oglesby, Ill., and 250 tons at Pratt, Kan. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for Class A water pipe and gas pipe.

**Old Material.**—The scrap market has been gathering strength, attributable largely to the stronger demand in Eastern markets and local buying of steel scrap. The influence of the marked improvement in new material conditions has also been effective. Higher prices have been paid in the last week for various materials, but the advances are for steel rather than rolling-mill grades. Comparatively little railroad scrap is being offered, and most of it is going to the dealers who are willing to pay higher prices on a rising market than consumers are being asked for scrap ready for shipment. The Grand Trunk has an offering of 4000 tons, the Wabash 1800 tons, and two other roads an aggregate of 800 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$12.25 to \$12.50
Old steel rails, rerolling	10.25 to 10.75
Old steel rails, less than 3 ft.	10.00 to 10.50
Relaying rails	19.50 to 20.50
Old carwheels	11.00 to 11.25
Heavy melting steel scrap	10.25 to 10.50
Frogs, switches and guards, cut apart	10.25 to 10.50
Shoveling steel	9.75 to 10.00
Steel axle turnings	7.25 to 7.50

Per Net Ton	
Iron angles and splice bars	\$11.75 to \$12.25
Iron arch bars and transoms	12.00 to 12.50
Steel angle bars	9.25 to 9.50
Iron car axles	13.50 to 14.00
Steel car axles	10.00 to 10.50
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.75 to 9.00
Steel knuckles and couplers	9.25 to 9.50
Steel springs	9.50 to 9.75
Locomotive tires, smooth	9.00 to 9.25
Machine shop turnings	5.00 to 5.50
Cast borings	5.00 to 5.50
No. 1 busheling	7.25 to 7.50
No. 2 busheling	6.00 to 6.50
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
Boiler punchings	8.25 to 8.50
No. 1 cast scrap	9.25 to 9.75
Stove plate and light cast scrap	8.25 to 8.50
Grate bars	7.50 to 7.75
Railroad malleable	8.75 to 9.25
Agricultural malleable	8.25 to 8.50
Pipes and flues	6.25 to 6.75



## Philadelphia

PHILADELPHIA, PA., July 6, 1915.

A changed spirit has come over the steel trade. Orders have been booked in good volume, prices are higher, and it looks as if hope long deferred was to be realized. An outstanding feature is the heavy demand for billets, and the consequent inadequacy of the open-hearth capacity. Two notable sales are one of 15,000 tons to the Steel Corporation and 9000 tons to Canadian interests. In finished steel products there has been a rush to get contracts booked at old quotations, an effort wherein some consumers failed because of the withdrawal of prices by the mills. Bars are stronger than plates, and the latter are stronger than shapes, but the position of all three is improved. Basic and low phosphorus irons are firmer, and buyers of foundry irons are not so anxious for concessions. Three or more furnaces are now engaged in making 80 per cent ferromanganese from Brazilian ore, but it is recognized that these could not grapple with the situation if steel production should get into full swing. Coke is stronger, and heavy melting steel scrap has advanced.

**Iron Ore.**—The only arrival reported in the week ended July 3 was 4900 tons from Cuba. About 15,000 tons of Brazilian manganese ore is afloat for this port. A sale of 20,000 tons of Eastern iron ore is reported.

**Pig Iron.**—Business in pig iron, particularly foundry grades, continues to lag far behind that in steel products, but there is some improvement, and activity is expected to grow steadily. The quantities now being specified against contracts run somewhat larger than a few weeks ago, and inquiries are more numerous. The Pennsylvania Railroad is in the market for some of its third quarter requirements, including 550 tons of charcoal iron, 400 tons of high manganese iron and 550 tons of low silicon iron. It is presumed that the company will ask bids also on some high silicon iron. The furnace stocks of Virginia iron increased a little in June, but in the past few days shipments have shown betterment, and sales also have increased. The deliveries are the real index to the situation as they indicate consumption and iron paid for. A local malleable castings interest is in the market for a round lot of iron. Low phosphorus iron has continued to gain in strength, and \$21 to \$21.50, Philadelphia, is firmly quoted for standard analysis, with some sellers willing to let business go by rather than reduce their price. They are well sold up, and have no intention of depleting their stocks at present quotations. Their product is much in demand for making high explosive shell stock. An eastern Pennsylvania mill is inquiring for 3000 tons. Sales to Canadian consumers continue an important factor. About 1500 tons of Lebanon low phosphorus was purchased in the week. Basic is stronger, though quieter than low phosphorus. Sellers continue to ask \$14. In the week 1500 tons was sold at the full price. Inquiry among foundrymen discloses that they would welcome higher prices for pig iron if they could get better prices for their castings. As matters stand, in buying iron, they are less inclined to demand concessions. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X, foundry.....	\$14.25 to \$14.50
Eastern Penna. No. 2 plain.....	14.00 to 14.25
Virginia, No. 2 X, foundry.....	15.25 to 15.75
Virginia, No. 2 plain.....	15.00 to 15.25
Gray forge .....	13.25 to 13.50
Basic .....	13.75 to 14.00
Standard low phosphorus .....	21.00 to 21.50

**Ferroalloys.**—The inquiry for 80 per cent ferromanganese is mostly confined to small lots of prompt, for which over \$100, seaboard, is easily obtained. No arrivals are reported for the week ended July 3. That the shortage has not been felt more acutely is attributed to three causes, namely, the heavy purchasing when the price was \$38 or near that figure, the lessened consumption of recent months, and the manufacture, from Brazilian ore, of the alloy by at least three domestic furnaces. Several thousand tons of manganese ore are afloat en route to this country, but this will not go far with an awakened demand calling

for a large tonnage of steel. One seller of the domestic product quotes \$100, furnace. He has 100 tons per day for disposal, though this amount could be increased. So far he has shipped 3000 tons to consumers. A furnace in western Pennsylvania is making 80 per cent ferromanganese, and in another case a conversion deal has been made with a company operating an electric furnace at Buffalo. The quotations for 50 per cent ferrosilicon are unchanged at \$71 to \$73, Pittsburgh, according to quantity.

**Bars.**—Since late in June consumers of steel bars have been active in getting their future requirements covered at prices which are not now to be had. Some of the quotations which had been hanging fire were as low as 1.15c., Pittsburgh. Not all who have been hesitating got the advantage of the old quotations, as the latter were withdrawn before the buyers came to a decision. For prompt deliveries of steel bars, 1.409c., Philadelphia (1.25c., Pittsburgh), is now asked, with contracts subject to negotiation and authorization from higher officials. The Pennsylvania Railroad is taking bids on 500 tons of concrete bars, and there are several smaller inquiries of this character. Iron bars are more active in all directions, and a local maker has advanced his price to 1.25c., mill, equal to 1.324c., Philadelphia. Shrapnel bars are active, one mill recording sales of 6000 tons in the week.

**Plates.**—Mills that were busy at about 90 per cent of capacity a week ago are equally so to-day; in fact, they are booking orders at over 100 per cent. Other makers, with whom demand developed more slowly, are getting more orders. The minimum quotation is 1.20c., Pittsburgh, or 1.359c., Philadelphia, and this only for prompt business. Contracts command 1.409c. With the end of June there was a rush to get on the books at the old prices. A large part of the orders taken came from shipyards.

**Rails.**—No orders or inquiries are reported in this territory.

**Structural Material.**—In this product there is less to support higher prices than in any of the others. Most of the mills, however, quote 1.409c., Philadelphia, for prompt shipment shapes, along with bars and plates. Competition on a good tonnage would bring out 1.359c. at least.

**Sheets.**—The market, which long has been unsatisfactory, has turned, and is now on a better basis. The minimum quotation for No. 10 blue annealed sheets is 1.509c., Philadelphia. To a moderate extent sheets are being exported by an eastern Pennsylvania maker. The domestic demand has improved.

**Billets.**—The shortage of open-hearth rolling steel has sent prices up sharply, and \$24.56 to \$25.06, Philadelphia, is quoted, which is on a basis of \$22 to \$22.50, Pittsburgh. A local mill has sold 15,000 tons of billets to the United States Steel Corporation. Another sale involved 9000 tons for delivery in the third quarter to a Canadian firm. These latter billets were square, with rounded corners, and the specifications made them exceedingly difficult to obtain. The Steel Corporation finally supplied them.

**Old Material.**—The market for steel has strengthened considerably and sales have been made at higher prices. Sellers say that \$12.50 is in sight for heavy melting steel. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$11.50 to \$12.00
Old steel rails, rerolling .....	12.00 to 12.50
Low phos. heavy melting steel scrap .....	15.00 to 15.50
Old steel axles .....	14.25 to 14.75
Old iron axles .....	17.50 to 18.00
Old iron rails .....	15.00 to 15.50
Old carwheels .....	12.00 to 12.50
No. 1 railroad wrought .....	13.00 to 13.25
Wrought-iron pipe .....	10.75 to 11.00
No. 1 forge fire .....	8.50 to 9.00
Bundled sheets .....	9.00 to 9.50
No. 2 busheling .....	7.75 to 8.25
Machine shop turnings .....	8.50 to 8.75
Cast borings .....	8.25 to 8.50
No. 1 cast .....	12.25 to 12.50
Grate bars, railroad .....	9.00 to 9.25
Stove plate .....	9.00 to 9.50
Railroad malleable .....	9.75 to 10.25



**Coke.**—The labor shortage, higher wages, and other considerations have stiffened the market for furnace coke. The making of contracts for foundry coke is practically completed with most sellers. The quotation for prompt or future delivery furnace coke is \$1.75 per net ton at oven. Prompt foundry is quoted at \$2 to \$2.40 and contract at \$2.20 to \$2.50. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

## Cincinnati

CINCINNATI, OHIO, July 7, 1915—(By Wire).

**Pig Iron.**—Sales and inquiries are not of sufficient volume to offer much encouragement for renewed activity in July. A few melters who generally buy to fill future requirements far ahead of general consumers are now feeling the market for first quarter and first half supplies in 1916. No quotations have been made by either Northern or Southern furnaces for this advanced delivery, and it will doubtless be some time before books are formally opened for business of this character. Many consumers are now taking midsummer inventories, and this together with the usual cessation of activities during a holiday week contributes to the present quiet conditions. Order books of different sales agencies show that there was a decided reversal of conditions prevailing during the first half of this year as compared with the record of 1914. In the first quarter of last year a large amount of iron was bought, while this year buyers held off until well into the second quarter before placing contracts. The total tonnage for the first half of the two years will be about equal, but last year's prices were more satisfactory. The jobbing foundries in this vicinity are running full time, but the stove makers are consuming a comparatively small quantity of iron. Basic iron is being used up at a very satisfactory rate by the sheet mills, but all steel works in this territory are now fairly well provided for and no inquiries are out. The minimum price of \$9.50, Birmingham basis, for No. 2 foundry has not disappeared on early delivery iron, but the majority of the Southern furnaces are unwilling to consider anything below \$9.75, and a few small contracts have been made at \$10. Northern foundry, malleable and basic are quoted at \$12.50, Iron-ton, for any shipment this year. A sale of 500 tons of Lake Superior charcoal iron is reported as being made to a Michigan consumer at current quotations and for last half shipment. Ohio silvery irons are quiet. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$12.90 to \$13.40
Southern coke, No. 2 f'dry and 2 soft.	12.40 to 12.90
Southern coke, No. 3 foundry.	11.90 to 12.40
Southern No. 4 foundry.	11.40 to 11.90
Southern gray forge	10.90 to 11.40
Ohio silvery, 8 per cent silicon.	16.91 to 16.26
Southern Ohio coke, No. 1.	14.76 to 15.26
Southern Ohio coke, No. 2.	13.76 to 14.26
Southern Ohio coke, No. 3.	13.51 to 13.76
Southern Ohio malleable Bessemer.	13.76 to 14.01
Basic, Northern	13.76 to 14.01
Lake Superior charcoal	16.20 to 17.20
Standard Southern carwheel	26.90 to 27.40

(By Mail)

**Coke.**—A southern Ohio furnace is reported to have closed for 15,000 to 20,000 tons, part of its last half supply. Foundry coke is still in fair demand, but contracts placed are not up to normal in size. We quote Connellsville and Virginia foundry cokes at \$2.25 to \$2.50 per net ton at oven.

**Finished Material.**—Quotations by nearby mills are unchanged around 5c., Pittsburgh, on No. 28 galvanized sheets. Local warehouse quotations are lower, but now show a tendency to advance to the mill price level. Some prompt business is reported from different sections of the country, but no long time contracts are being made. Black sheets remain around 1.80c., Pittsburgh, for No. 28, although this figure could be shaded on desirable business. Steel bars from stock are sold at 1.75c., Cincinnati. Steel hoops and bands show some improvement.

**Old Material.**—More cheerful reports are issued by dealers, as consumers of scrap are beginning to believe that present prices are about at the bottom. The jobbing foundries are melting a larger quantity than usual, and the demand from the rolling mills is also encouraging. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap	\$6.25 to \$6.75
Old iron rails	10.50 to 11.50
Relaying rails, 50 lb. and up.	19.25 to 19.75
Re-rolling steel rails	9.75 to 10.25
Melting steel rails	8.50 to 9.00
Heavy melting steel scrap	8.50 to 9.00

Per Net Ton	
No. 1 railroad wrought	\$8.50 to \$9.00
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.00
Railroad cast scrap	9.00 to 9.50
No. 1 machinery cast scrap.	10.25 to 10.75
Burnt scrap	6.50 to 7.00
Old iron axles	13.50 to 14.00
Locomotive tires (smooth inside)	8.50 to 9.00
Pipes and flues	5.75 to 6.25
Malleable and steel scrap.	7.00 to 7.50
Railroad tank and sheet scrap.	5.00 to 5.50

## Buffalo

BUFFALO, N. Y., July 6, 1915.

**Pig Iron.**—The market is quiet. Inquiry is of fairly good volume. Sales aggregating 4000 to 5000 tons foundry grades are reported, with considerable tonnage still pending. A sentimental change is noted toward a stiffening of prices by sellers and a higher range is looked for by furnacemen for the near future. Some producers are now holding to \$13 at furnace as minimum. We quote as follows, f.o.b. furnace, Buffalo, for last half delivery:

No. 1 foundry	\$12.75 to \$13.25
No. 2 X foundry	12.50 to 13.00
No. 2 plain	12.50 to 12.75
No. 3 foundry	12.25 to 12.75
Gray forge	12.25 to 12.75
Malleable	12.50 to 12.75
Basic	13.00 to 13.50
Charcoal, regular grades and analysis	15.75 to 17.25
Charcoal, special grades and analysis	19.00 to 20.00

**Finished Iron and Steel.**—Specifications for June were very heavy. In bars and small shapes the month was the second largest in the history of the business. Practically all contracts which expired on June 30 were specified in full. Specification on new contracts has shown a little lull, due in part to the holidays, but mills are filling up rapidly in all sizes over 2 in. rounds and deliveries are becoming extended to 4 to 5 months, and on shafting rounds and special forging rounds deliveries are 2 to 3 months behind. There are indications of an early advance in bars. Some mills which have been quoting 1.20c., Pittsburgh, on structural material and plates have established a minimum of 1.25c. and have notified their customers that a price of 1.30c. will probably be established in July. The mills are now in a more independent position than for the past two years and are requiring district sales offices to submit new business for consideration before acceptance. In wire and wire products bookings are large, deliveries are becoming extended, and prices are advancing. Leading makers have withdrawn all quotations below \$1.60 for wire nails and \$1.40 for wire products. Galvanized barb wire has again been advanced, especially on 80-rod spools. The demand for cold finished steel is heavy and several of the leading producers have entirely withdrawn from the market. Quotations seem to be firmly established at 66 per cent discount for carload lots and 61 per cent discount for less than carloads, from new list, f.o.b. cars, Pittsburgh. In structural materials, last month was the largest since February, 1913, and there is every indication that the volume of business will become increasingly large. The Williams Bridge Company, Syracuse, has taken 100 tons for the H. H. Franklin Mfg. Company, Syracuse.

**Old Material.**—The double holiday caused a slight slackening, but demand is good and prices are hold-

ing firmly. The market is reflecting the somewhat firmer trend shown in pig iron. Heavy melting steel, turnings, borings, and busheling scrap were the commodities most dealt in. We quote dealers' asking prices, per gross ton, f.o.b., Buffalo, as follows:

Heavy melting steel	\$10.75 to \$11.00
Low phosphorus steel	13.00 to 13.50
No. 1 railroad wrought scrap	10.50 to 11.00
No. 1 railroad and machinery cast	11.00 to 11.50
Old steel axles	12.00 to 12.50
Old iron axles	16.00 to 16.50
Old carwheels	11.50 to 12.00
Railroad malleable	10.50 to 11.00
Machine shop turnings	5.75 to 6.25
Heavy axle turnings	8.50 to 9.00
Clean cast borings	6.75 to 7.00
Old iron rails	11.00 to 11.50
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	8.25 to 8.75
Wrought pipe	7.00 to 7.50
Bundled sheet scrap	7.25 to 7.75
No. 1 busheling scrap	8.50 to 9.00
No. 2 busheling scrap	6.50 to 7.00
Bundled tin scrap	9.00

## Cleveland

CLEVELAND, OHIO, July 6, 1915.

**Iron Ore.**—The ore market shows improvement. A few small sales are reported and some inquiries pending for fair-sized tonnages. June shipments amounted to 6,005,091 gross tons, a gain of 502,724 tons over June, 1914. Lake shipments to July 1 amounted to 11,521,283 tons as compared with 9,624,116 tons in the corresponding period of 1914. We quote prices as follows, delivered to lower Lake ports: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.45; old range non-Bessemer, \$3; Mesaba non-Bessemer, \$2.80.

**Pig Iron.**—The market is not active, but there is a somewhat better volume of inquiries for foundry iron in small lots and shipments are very satisfactory. While \$12.50 continues to be the general selling price for No. 2 foundry iron some of the Valley furnaces are trying to get an advance of 25c. per ton. Efforts to buy foundry iron for the first half of 1916 have so far apparently proved unsuccessful. Some inquiries have come out for contracts covering fourth and first quarters, but no business is reported placed for delivery beyond Jan. 1. Producers do not feel that conditions warrant the opening of their books for first quarter business except at an advance over present prices. Southern iron is quiet, with quotations unchanged; it can be bought at \$9.50, Birmingham, for No. 2 for prompt shipment and third quarter, although some producers are quoting \$9.75 to \$10. We quote, f.o.b. Cleveland, as follows:

Bessemer	\$14.65
Basic	13.55
Northern No. 2 foundry	13.00
Southern No. 2 foundry	\$13.50 to 14.00
Gray forge	12.75
Jackson Co. silvery 8 per cent silicon	16.37 to 16.62
Standard low phosphorus at furnace	19.75 to 20.00

**Coke.**—Foundries are now mostly under contract and the buying has quieted down. There is some demand for prompt shipment coke. We quote standard Connellsville foundry coke at \$2.25 to \$2.50 per net ton at oven for prompt shipment and contract. Connellsville furnace coke is held at \$1.55 to \$1.60 for prompt shipment and at \$1.70 to \$1.75 for the remainder of the year.

**Finished Iron and Steel.**—A good volume of new business is coming out in steel bars, plates and structural material, and mills are well filled up for the third quarter. At least one mill is taking no further orders except for prompt shipment. Specifications on second quarter contracts were unusually heavy in the last few days of June. The market is very firm at 1.25c., Pittsburgh, for steel bars and structural material, and there is considerable talk of an early advance to 1.30c. Some business is being taken at the latter price for less than carload lots. Plates are firmer, and 1.20c., Pittsburgh, appears to be the minimum quotation. Deliveries are getting slower and premium prices have been offered for prompt shipment. A new inquiry for 45,000 tons of steel for making shells has come from a broker. A leading Ohio automobile maker is in the market for several thousand tons of alloy steel for first half of 1916 requirements. The demand from the automobile trade for forging steel bars continues heavy. In structural lines the Forest City Steel & Iron Company has taken 400

tons for a factory building for the Miller Rubber Company, Akron, Ohio, and the American Bridge Company has taken 260 tons for a building for the Atwood Automobile Company, Toledo, and 100 tons for a mill building for the American Steel Package Company, Defiance, Ohio. The demand for sheets has improved, and prices on galvanized and blue annealed sheets are somewhat firmer. We quote No. 28 black sheets at 1.75c. to 1.80c., Ohio mill, and No. 10 blue annealed at 1.35c. Galvanized sheets are held at 5c. for No. 28. There is a fair demand for forging billets, which are quoted at \$26.75 to \$27, Pittsburgh. Prices on hard steel bars are firmer, and 1.15c., Pittsburgh, is now the minimum quotation. Iron bars are inactive, with prices unchanged at 1.15c., Pittsburgh. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

**Bolts, Nuts, and Rivets.**—Bolt and nut makers have advanced prices 5 per cent on bolts and 10c. to 30c. per cwt. on nuts. There is a good volume of specifications and new business, and most plants are well filled with orders. Some rivet contracts are being placed for the third quarter at \$1.50, Pittsburgh, for boiler and \$1.60 for structural. Bolt and nut discounts are as follows: Common carriage bolts,  $\frac{3}{4}$  x 6 in., smaller or shorter, rolled thread, 75, 10, and 10 per cent; cut thread, 75, 10, and 10 per cent; larger or longer, 75 and 10 per cent; machine bolts with h.p. nuts,  $\frac{3}{4}$  x 4 in., smaller or shorter, rolled thread, 75, 10, 10, and 10 per cent; cut thread, 75, 10, 10 and 5 per cent; larger or longer 75 and 15 per cent; coach and lag screws, 80 and 20 per cent; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.10 off; c.p.c. and t-square nuts, blank or tapped, \$5.80 off; hexagon,  $\frac{3}{4}$  in. and larger, \$7.25 off; 9/16 and smaller, \$8 off; semi-finished hexagon nuts,  $\frac{3}{4}$  in. and larger, 85, 10, and 10 per cent; 9/16 and smaller, 85, 10, 10, and 10 per cent.

**Old Material.**—The market is inactive and prices are not firm. There is somewhat of a deadlock between dealers and consumers, owing to the refusal of the latter to pay the prices asked. Dealers have been making some speculative purchases of scrap, expecting higher prices, and in order to move some of this material that was loaded on cars they had to let it go at a sacrifice. Quotations are unchanged. We quote, f.o.b. Cleveland, as follows:

### Per Gross Ton

Old steel rails, rerolling	\$11.00 to \$11.75
Old iron rails	12.00
Steel car axles	12.25 to 12.75
Heavy melting steel	10.50 to 11.00
Old carwheels	9.75 to 10.00
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	8.50
Railroad malleable	10.25 to 10.50
Steel axle turnings	8.75 to 9.00
Light bundled sheet scrap	8.00 to 8.50

### Per Net Ton

Iron car axles	\$14.00 to \$14.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings	5.50 to 5.75
No. 1 busheling	8.50 to 8.75
No. 1 railroad wrought	9.25 to 9.50
No. 1 cast	9.75 to 10.25
Stove plate	8.00 to 8.25

## St. Louis

ST. LOUIS, Mo., July 5, 1915.

**Pig Iron.**—Optimism is growing, largely on the realization that the new crops about to come into market will set business moving. Melters are beginning to call more insistently for their allotments and practically all transactions are now for prompt delivery. Stiffness in price is largely attributable to the demand in other territories.

**Coke.**—A lead smelter took 36,000 tons for delivery over 12 months, dividing it between two representatives and among three brands. Part of the order went to Virginia ovens, part to a Middle West by-product plant, and a little more than one-third to the local by-product plant recently opened. The price was not made public, but it is known that deep cutting was done and evidence was given that the local plant will have to be reckoned with in this territory when it gets into full producing operation. Open quotations for



by-product coke are made at \$5, but competition will carry the figure very much closer to \$4 delivered St. Louis, if the lot be a large one.

**Finished Iron and Steel.**—The most important event of the week was the opening of the bids for the 24,000 tons of fabricated material for the municipal free bridge. The lowest bid was 2.165c. by the American Bridge Company, with 2.175c. by the Cambria Steel Company as the next lowest. Certain collateral propositions will have to be figured out before the award is formally made, as these, it is stated, may make the higher bid really the cheaper. Fabricators are becoming more active and are looking for steady increase in business. One award was of about 400 tons to a local concern for a combined railroad ticket office. Bars are in fair demand, both ordinary and reinforcing. Track fastenings are moving rather freely. Tank plates are weak. Movement out of warehouse is very good at firm prices, which we quote as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled one pass, 2.55c.; No. 28 galvanized sheets, black sheet grade, 4.85c.

**Old Material.**—There has been increased activity, due to increasing inquiry and some disposition on the part of the dealers to speculate on the promised improvement. In prices this speculative feeling has had some slight effect, but quotations should be regarded in the light of the conditions noted. Lists out include one of 1800 tons from the Wabash and one of 200 tons from the Vandalia. Others are expected during the coming week. We quote dealers' prices f.o.b. St. Louis as follows:

*Per Gross Ton*

Old iron rails.....	\$10.25 to \$10.75
Old steel rails, re-rolling.....	9.75 to 10.25
Old steel rails, less than 3 feet.....	10.50 to 11.00
Relaying rails, standard section, subject to inspection.....	22.00 to 23.00
Old car wheels.....	9.00 to 9.50
No. 1 railroad heavy melting steel scrap.....	9.00 to 9.50
Shoveling steel.....	8.00 to 8.50
Frogs, switches and guards cut apart.....	9.00 to 9.50
Bundled sheet scrap.....	5.75 to 6.25

*Per Net Ton*

Iron angle bars.....	\$10.00 to \$10.50
Steel angle bars.....	8.00 to 8.50
Iron car axles.....	13.75 to 14.25
Steel car axles.....	9.75 to 10.25
Wrought arch bars and transoms.....	11.00 to 11.50
No. 1 railroad wrought.....	7.75 to 8.25
No. 2 railroad wrought.....	7.75 to 8.25
Railroad springs.....	8.00 to 8.50
Steel couplers and knuckles.....	8.00 to 8.50
Locomotive tires, 42 in. and over, smooth inside.....	8.75 to 9.25
No. 1 dealers' forge.....	7.00 to 7.50
Mixed borings.....	4.75 to 5.25
No. 1 busheling.....	7.25 to 7.75
No. 1 boilers cut to sheets and rings.....	6.00 to 6.50
No. 1 railroad cast scrap.....	8.00 to 8.50
Stove plate and light cast scrap.....	6.50 to 7.00
Railroad malleable.....	6.00 to 6.50
Agricultural malleable.....	5.50 to 6.00
Pipes and flues.....	6.00 to 6.50
Railroad sheet and tank scrap.....	6.00 to 6.50
Railroad grate bars.....	6.50 to 7.00
Machine shop turnings.....	5.00 to 5.50

## Birmingham

BIRMINGHAM, ALA., July 5, 1915.

**Pig Iron.**—Only one iron company in this district continues to report sales equal to its make. After selling over 50,000 tons in June, against a production of 25,000 tons, a brisk business for the first few days of July was also announced. The leading interest reports sales of a few small lots on the \$10 basis. Another sold a total of 3500 tons in June on the same basis. It is evident that those asking \$10 for spot as well as forward delivery have not booked many orders. The business going seems to be at \$9.75 for spot and \$10 for forward, but forward delivery at \$9.75 can be secured if a portion of the spot orders is of respectable tonnage, and an extension of this price in such circumstances to Sept. 1 is probably possible. Perhaps only one interest in the district is actively seeking business, the others being well sold up as compared with holdings. Inquiries from the Chicago district, on which a Birmingham interest quoted \$10, elicited a refusal to

contract, the buyer stating that he could do better. A small lot of spot iron, on which one maker quoted \$10, went to another. Sales of 5000 tons of No. 2 at \$10 and a like amount of No. 3 at \$9.50 for forward delivery are reported. The Tennessee Company announces the blowing in of a stack at Ensley and one Alice in Birmingham. It is probable that chilled iron will be made at Alice. The Republic Company has blown out a stack for relining, but one went in a month ago to take its place. No announcement is forthcoming with reference to the blow-in of another stack by the Sloss-Sheffield Company, which now has three active ones. The Vanderbilt stack of the Woodward Iron Company is expected to go in about the middle of the month. The Alabama make will probably be increased by 10,000 to 12,000 tons in July as compared with June. Sales of Clifton iron, which is high in manganese, at \$11 to \$12.50 are reported. The make of steel rails at Ensley will be larger in July than in June. The wire mill of the American Steel & Wire Company at Fairfield is operating at 60 per cent of its capacity. We quote, per gross ton, f.o.b. Birmingham district furnaces, for spot and forward delivery, as follows:

No. 1 foundry and soft.....	\$10.25 to \$10.50
No. 2 foundry and soft.....	9.75 to 10.00
No. 3 foundry.....	9.25 to 9.50
No. 4 foundry.....	9.00 to 9.25
Gray forge.....	8.75 to 9.00
Basic.....	9.75 to 10.00
Charcoal.....	21.00 to 21.25

**Coal and Coke.**—The coke market is fairly good, with shipments covering a wide territory. The Pacific coast is taking a steady quantity, and there are some inquiries from Mexico. The output is taken care of. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.50 to \$2.75; foundry, \$3 to \$3.25; by-product, \$2.25 to \$2.50, with some makes selling higher. The coal market has been further stimulated by additional large contracts placed by the Southern Railway, the Pratt Consolidated securing one for 200,000 tons, and others getting smaller quantities. The Southern Cotton Oil Company contracted for 25,000 tons with the Alabama and Pratt Consolidated companies. Other large contracts are expected. The initial cargo of coal from the Pratt Consolidated mines on the Warrior River is being towed to Mobile.

**Cast-Iron Pipe.**—It is mid-season in water and gas pipe circles and the orders, as is customary, are coming in for small lots and small sizes. The tendency is to harden present prices in the case of small sizes. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$20; 6-in. and upward, \$18, with \$1 added for gas pipe.

**Old Material.**—The market is very weak, with little demand from consumers. We quote, per gross ton, nominal prices, f.o.b. dealers' yards, as follows:

Old iron axles.....	\$13.00 to \$13.50
Old steel axles.....	12.50 to 13.00
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	8.50 to 9.00
No. 2 railroad wrought.....	7.50 to 8.00
No. 1 country wrought.....	8.00 to 8.50
No. 1 machinery cast.....	8.25 to 8.50
No. 1 steel scrap.....	8.00 to 8.25
Tram carwheels.....	8.25 to 8.50
Stove plate.....	7.00 to 7.50

Bulletin No. 78, by A. P. Kratz, entitled "A Study of Boiler Losses," has been issued by the Engineering Experiment Station of the University of Illinois, Urbana, Ill. It presents a critical analysis of the data obtained from a series of trials made on a 500-hp. Babcock & Wilcox boiler located in the heating plant of the university. The boiler was operated under varying conditions. The heat balance has been subdivided so as to isolate and determine the amounts of the several losses chargeable to the boiler, furnace, and setting. Complete forms for calculating a series of boiler trials are also given. Tests were made also upon some samples of weathered coal. No difficulty was experienced in burning this coal, but it was found that it had deteriorated during the weathering until it was about the same composition and grade as fresh Vermilion County screenings. Copies may be obtained gratis on application to C. R. Richards, acting director of the station, Urbana, Ill.



## New York

NEW YORK, July 7, 1915.

**Pig Iron.**—There are indications of a slight increase in the melt of foundry iron, but they are not pronounced. Here and there foundries are asking for shipments in excess of the contract rate. At the same time there is close competition for the business coming up and prices still vary considerably. An inquiry for 3000 to 5000 tons, with deliveries in the first half of 1916, has come up in New England; some furnaces have declined to quote that far ahead, but it is stated that Buffalo iron has been offered for delivery over several months in 1916 at close to \$13 at furnace. The requirements of an important Connecticut malleable interest are also before the pig iron trade with purchases understood to be still in abeyance. An inquiry for 1250 tons of foundry iron has come up in New Jersey and one for 2000 tons is being bid on by New York firms. The Buffalo market shows some variations, though with enough business to keep their furnaces going until well into the fourth quarter, some interests are adhering to \$13 for No. 2 X on forward delivery business. Some export inquiry for steel making iron is reported. Virginia makers quote \$12.50 for No. 2 X at furnace for early delivery, while for fourth quarter \$12.75 and higher is asked. We quote at tidewater as follows: No. 1 foundry, \$14.50 to \$14.75; No. 2 X, \$14.25 to \$14.50; No. 2 plain, \$13.75 to \$14; Southern iron, \$14.50 to \$14.75 for No. 1 and \$14.25 for No. 2.

**Ferroalloys.**—Information conveyed to representatives here of British producers of ferromanganese indicates a possible restriction of future licenses for shipment by the British government. Just when this may occur, why and to what extent is unknown, but the entire situation is stiff. The Larchmore, a vessel regularly bringing at least 1000 tons to this side, has recently been torpedoed on its return trip to England, and the problem of securing a ship to take its place is a difficult one. It is also learned that the British manganese ore situation is full of difficulties; that prices are higher, Brazilian ore being at least 45c. per unit, delivered at port, and that the increased cost of coke is a big factor in the expense of producing ferromanganese. However, shipments are still being received here sufficient to satisfy the present needs of consumers. It is stated that inquiries for small quantities by regular consumers are becoming more numerous, many of them being unexpected and caused by increased orders for steel into which the alloy goes. Many of these have resulted in sales of from 25 to 200 tons at \$100, seaboard, aggregating over 1000 tons in the past week. It is reported that there have been a few sales of domestic ferromanganese at \$100 delivered. Sales of spiegeleisen by a western Pennsylvania producer have been made at some concession in prices. Ferrosilicon, 50 per cent, is in strong demand, both for domestic and foreign account at \$71 to \$73 Pittsburgh.

**Structural Materials.**—Except for options carried over from the second quarter, no new business appears to be done at less than 1.25c., Pittsburgh, for plain material, and the market is firm, at least temporarily, as views are not wanting that attractive lots will still be obtainable at 1.20c., Pittsburgh basis. In spite of the low railroad buying and no increase in the volume of new projects, mill stocks are lower and sentiment runs strong that structural demand is looking upward; but it seems clearer that the general view is that betterment will be merely gradual, though for months to come. An interesting event is the early addition to the structural rolling capacity of the East of a new mill of the Pennsylvania Steel Company, capable also of rolling rails. Decisions are expected soon on steel for the Charmion apartment, West End Avenue and Seventy-fifth Street, 1100 tons; on a building for Balch, Price & Co., Brooklyn, about 750 tons, and still another building is to be erected for the Winchester Repeating Arms Company, this one, by the Aberthaw Construction Company. On July 20 bids will be taken on the Culver elevated section of the subway system in Brooklyn, involving 10,000 to 12,000

tons. With awards of 600 tons for the Boston & Albany to the Pennsylvania Steel Company, 750 tons for the Gulf, Florida & Alabama to the American Bridge Company, and 275 tons for the Lehigh & New England to the Phoenix Bridge Company, practically no railroad work is pending beyond 100 tons for the Philadelphia & Reading. The largest definite letting, since the last report, totals 6500 tons for the Eastern Parkway subway, Brooklyn, awarded to the American Bridge Company, and the other awards include the following: 1100 tons for an apartment, 105 West 140th Street to the Hinkle Iron Company; 1100 tons for the Ayer loft, West Thirty-sixth Street, to Levering & Garrigues Company, which has also taken 400 tons for the grand stand for the Essex County Park Commission at Newark, and 300 tons for a coal breaker for the Lehigh Valley Coal Company; 300 tons for the lime plant, Vermont Marble Company, West Rutland, to the Belmont Iron Works; 250 tons for No. 14 School, Rochester, to the Genesee Bridge Company; 500 tons for the Frith Building, 35 West Thirty-seventh Street, to Milliken Brothers; 200 tons for a store and office building, Yonkers, to the Lenox Iron Works; 350 tons for a store and loft, 626 Fifth Avenue, to the Hay Foundry & Iron Works, and 2500 tons for the plate and angle shop, Fore River Shipbuilding Company, to the Boston Bridge Company. We quote new shipments at 1.25c., Pittsburgh, or 1.419c., New York, with the reservation that large lots, attractive from a mill standpoint, might be obtained for 1.20c., Pittsburgh, basis. For small lots from store, we quote 1.85c. to 1.90c., New York.

**Steel Plates.**—The 1.15c. Pittsburgh basing seems to have disappeared except on some deferred purchases not yet closed. Mills are making a strong effort to hold for 1.20c. and 1.25c. Pittsburgh basis, and in the absence of definite information to the contrary quotations remain at \$1 a ton higher than was true two weeks ago. Foreign inquiry continues for ship and boiler plates, but it is only in the lighter and narrower plates that mills are specially seeking business. We quote 1.20c. to 1.25c., Pittsburgh, or 1.369c. to 1.419c., New York, the higher figure being charged for the smaller lots and for fourth quarter. Plates from store are 1.85c. to 1.90c., New York.

**Iron and Steel Bars.**—In some quarters it is learned that jobbers have not all covered for the third quarter, and as they resisted paying 1.20c., Pittsburgh basis, for this period, they are now facing the possibility of paying 1.25c., Pittsburgh. Along with steel bars, iron bars have stiffened and best grades of refined iron are difficult to obtain below 1.15c. at mill, and the bulk of the business appears to be going at 1.20c. mill. We quote mill shipments of steel bars at 1.25c., Pittsburgh, or 1.419c., New York, and refined iron bars 1.25c. to 1.30c., New York. Out of store in New York iron and steel bars are 1.80c. to 1.85c.

**Old Material.**—The reports of improving business in finished steel products have strengthened the views of dealers, who have advanced the price of heavy melting steel scrap 25c. per ton. As far as can be ascertained, such buying as has been done has largely been by dealers, the steel companies continuing to purchase but sparingly. Dealers are confident that consumers will be obliged to pay higher prices soon. Rolling mills are doing little in the market. Brokers' quotations to local dealers and producers, per gross ton, New York, are as follows:

Old girder and T rails for melting	\$9.25 to \$9.50
Heavy melting steel scrap	9.25 to 9.50
Relaying rails	19.00 to 19.50
Re-rolling rails (nominal)	9.00 to 9.25
Iron car axles (nominal)	15.25 to 15.75
Steel car axles (nominal)	11.75 to 12.25
No. 1 railroad wrought	10.50 to 10.75
Wrought-iron track scrap	9.50 to 9.75
No. 1 yard wrought, long	9.50 to 9.75
No. 1 yard wrought, short	9.00 to 9.25
Light iron (nominal)	3.25 to 3.75
Cast borings	6.00 to 6.25
Wrought turnings	6.00 to 6.25
Wrought pipe	8.50 to 8.75

Dealers report the demand for cast scrap about the same as for several weeks, no increase being apparent. Quotations to consumers are as follows, per gross ton, New York:

old car wheels .....	\$9.50 to \$10.00
No. 1 machinery cast .....	10.50 to 11.00
No. 2 heavy cast .....	9.75 to 10.25
Stove plate .....	8.00 to 8.25
Locomotive grate bars .....	7.50 to 8.00
Malleable cast (railroad) .....	7.50 to 8.00

**Cast-Iron Pipe.**—On July 19 the commissioners of the District of Columbia, Washington, D. C., will open bids on 1400 tons of 3 to 12 in. On the same date Totowa, Passaic County, N. J., will open bids on 11 miles of 4 to 10 in. Private buying keeps up quite well. Prices are firmly maintained. Carload lots of 6-in., class B and heavier, are quoted at \$22.50 to \$23, per net ton, tidewater, class A and gas pipe taking an extra of \$1 per ton.

## British Market Firm

### Manganese Ore Easier—Pig Iron Higher—Fuel Problem Becoming Serious

(By Cable)

LONDON, ENGLAND, July 7, 1915.

The pig-iron market is firmer. Six furnaces on Cleveland iron are blowing out because selling prices are unremunerative owing to the cost of coke. There is considerable trouble with coal miners in all parts of the country and the fuel output is seriously reduced thereby. Cleveland pig-iron shipments in June were 56,806 tons, the best since November. Semi-finished steel is quiet, and some makers are rather willing to sell, owing to the paralysis of the galvanized sheet trade. Finished steel is firm and tending higher. Manganese ore seems slightly easier. Tin plates are quiet and featureless. Stocks of pig iron in Connal's stores were 148,988 tons at the close of last week against 152,633 tons one week previous. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 19s. (\$4.62).

Cleveland pig-iron warrants, 67s. 7d. (\$16.44), against 66s. 2½d. (\$16.11) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 67s. 9d. (\$16.48), compared with 66s. 6d. (\$16.18) a week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £11 15s. (\$57.18).

Steel ship plates, Scotch, delivered local yards, £9 15s. (\$47.44).

Steel rails, export, f.o.b. works port, £8 15s. (\$42.58), against £8 7s. 6d. (\$40.75) last week.

Hematite pig iron, f.o.b. Tees, 100s. (\$24.33).

Sheet bars (Welsh), delivered at works in Swansea Valley, £7 10s. (\$36.49).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £10 (\$48.66).

Steel bars, export, f.o.b. Clyde, £10 15s. (\$52.31).

Ferromanganese, f.o.b., £20 15s. (\$100.98).

Ferrosilicon, 50 per cent, c.i.f., £14 5s. (\$69.35).

The Fox River Cornice Company, Green Bay, Wis., booked its largest sheet metal order last week when it was awarded the contract for supplying all the sheet material to be used in the new domestic science building at Stout Institute, Menomonie, Wis. The order is valued at \$11,500. The company also has the contract for furnishing skylights and sheet metal for the addition to the Four Wheel Drive Automobile Company's plant at Clintonville, Wis., and for large construction jobs at Seymour, Shiocton, Marinette, Black Creek, Grand Rapids, and Prairie du Sac, Wis.; Ewen, Mich., and other cities.

The Riser & Molding Company, Stewart Avenue, Brooklyn, N. Y., is in the market for lots of odd sized sheets of regular U. S. standard gages. Variations from the regular standard sizes are not important, but the thicknesses should be those regularly rolled.

## Metal Market

NEW YORK, July 7, 1915.

### The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin, New York		Lead, New York		Spelter, New York	
June	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
30.....	22.50	20.00	39.37½	5.75	5.62½	22.00	21.50
July							
1.....	22.50	19.87½	39.10	5.75	5.65	22.00	21.50
2.....	22.50	19.75	38.80	5.75	5.67½	22.00	21.50
3.....	22.50	19.75	.....	5.75	5.67½	22.00	21.50
6.....	22.50	19.75	39.25	5.75	5.62½	22.00	21.50

Copper is easier in a waiting market. Tin is dull and lower. Lead is firm, but buying is light. Spelter continues firm and rather scarce for early delivery. Antimony is quiet but firm.

### New York

**Copper.**—The market is almost at a standstill, and prices quoted by second-hands and some of the smaller producers are easier. More is heard of offerings at concessions than of actual business. As for consumption, it is light for peaceful purposes and heavy for the manufacture of war munitions. Makers of the latter have never closed against good-sized inquiries they put out recently, and it is assumed that they are waiting for lower prices. Electrolytic is quoted at 19.75c to 20c., cash, New York, but offerings are reported to have been made lower than 19.75c. Good Lake copper is quoted at 22.50c., New York. The exports of copper in June totaled only 15,751 tons, against 28,889 tons in May.

**Tin.**—Practically the only business in the past few days has been in small lots of spot. Consumers some weeks ago entered contracts for future shipments and they are getting deliveries now which are providing for their requirements. The supply, both of spot and future metal, is ample and the market is without feature, save for the June statistics. These showed that the deliveries into consumption in the six months of this year totaled 21,575 tons, a decrease of 1525 tons, as compared with the same period of 1914. The total visible supply June 30 was 15,927 tons, against 14,646 tons a month previous, and 16,027 tons, June 30, 1914. There is afloat to-day 7830 tons. The quotation yesterday was 39.25c.

**Lead.**—The lots which were offered by independent producers and other sellers at below the price of the leading interest have been almost entirely absorbed and the New York quotation yesterday was 5.75c. on nearly every side. The St. Louis price was 5.62½c. Dealers were among those who bought up the cheap lead, and by some of them it is predicted that the price will go to 6c., New York, in the near future. There is a fairly good export demand, but sales are out of the question because London is below New York parity. The strike of miners in Missouri has had but little effect on the market. All interested are awaiting developments. The exports in June totaled 6606 tons.

**Spelter.**—The market is firm at about 22c., New York, and 21.50c., St. Louis, but not much activity is to be reported. July and August deliveries are rather difficult to secure and this, together with the continuance of the miners' strike in the ore fields, holds quotations steady. There is some business, of course, and where brass mill grades are concerned prices up to 24c. for August, and 25c. for the last quarter, are asked and obtained. Business has been done into the first quarter of next year at good prices. The June exports totaled 2746 tons.

**Old Metals.**—The market is very quiet. Dealers' selling prices are as follows, but are wholly nominal:

	Cents per lb.
Copper, heavy and crucible .....	18.25 to 18.75
Copper, heavy and wire .....	18.00 to 18.50
Copper, light and bottoms .....	15.50 to 16.00
Brass, heavy .....	13.50 to 14.00
Brass, light .....	11.50 to 12.00
Heavy machine composition .....	14.50 to 15.00
No. 1 yellow rod brass turnings .....	14.00 to 15.00
No. 1 red brass or composition turnings .....	12.50 to 13.00
Lead, heavy .....	5.00
Lead, tea .....	4.75
Zinc, scrap .....	12.00



**Antimony.**—The demand is quiet, but quotations on Chinese and Japanese are firm at 36.75c. to 37.25c. for prompt delivery.

### Chicago

**JULY 6.**—A fairly active trading in copper has sustained prices in the face of a general market that has shown some tendency to lower quotations. Tin is slightly lower, and prices for spelter and zinc are largely nominal. We quote: Casting copper, 19.25c.; Lake copper, 20.25c.; tin, carloads, 40c.; small lots, 42c.; lead, 5.50c. to 5.75c.; spelter, nominally, 22c.; sheet zinc, nominally, 25c.; Cookson's antimony, 52c.; other grades, 40c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 16c.; copper bottoms, 15c.; copper clips, 15.75c.; red brass, 13c.; yellow brass, 12.75c.; lead pipe, 4.75c.; zinc, 8c.; pewter, No. 1, 23c.; tinfoil, 33c.; block tin pipe, 36c.

### St. Louis

**JULY 5.**—The market has been quieter. The lead and spelter situation has been complicated by a miners' strike in the Joplin district which has stiffened ore prices somewhat. The metals are quoted to-day as follows: Lead, 5.70c. to 5.75c.; spelter, 20c. to 21c.; tin, 44c.; Lake copper, 21c.; electrolytic copper, 20.50c.; antimony, 42.50c. In the Joplin ore market, zinc blende was sold at \$70 to \$111 per ton, with very little going at the low price, even the leanest ores being eagerly sought because of the reduction of production. The top settlement was \$114 for premium ores. Calamine was \$50 to \$75, basis range, and the top settlement about \$83. Lead ore was easy at \$60. Miscellaneous scrap metals are quoted as follows: Light brass, 10c.; heavy yellow brass, 11½c.; heavy red brass and light copper, 13¼c.; heavy copper and copper wire, 17c.; tinfoil, 32c.; pewter, 25c.; lead, 4½c.; zinc, 12c.; tea lead, 3½c.

### A New Zinc Operation in Japan

It is stated that a large zinc plant will be established in Japan in the near future by merchants interested in meeting the demands of the domestic market. Because of the war imports of zinc into Japan from Germany and Belgium have been entirely suspended and the price has risen from \$120 per ton before the war to \$200 per ton. The exportation of zinc ore from the large zinc mines of Siberia to Germany and Belgium being stopped, the price fell and the Mitsu Bussan Kaisha Zinc Refinery took advantage of this and entered into an arrangement with the owners of the mines for supplies of ore and it is this company that is to put up the new plant. The only other company in Japan refining zinc is the Amagasaki Zinc Company.

The Goodyear Tire & Rubber Company, Akron, Ohio, reports a phenomenal demand for all kinds of rubber hose and other mechanical rubber goods. For garden hose the unusually dry weather in April was the cause of a hurry call from all sections which compelled that department to run night and day, turning out a volume of 240,000 ft. per week. No less remarkable has been the demand for Kantkink hose designed for garages, shops, mines, etc. It having been found that a need existed for a hose that would successfully resist the action of gasoline, having a tube which will not discolor the fluid, the Goodyear Company has developed one which meets these specifications, as proved by actual service tests, and it is in active request.

The second Pan-American Scientific Congress, which is to be held in Washington, Dec. 27, 1915, to Jan. 8, 1916, with headquarters at the Pan-American Union, Washington, is to include among its nine main program divisions the subjects of mining and metallurgy. The chairman of the section is Hennen Jennings, formerly president of the London Institution of Mining and Metallurgy. Dr. Glen Levin Swiggett is assistant secretary in charge of the organization of the congress and Dr. John Barrett, director general of the Pan-American Union, is its secretary general.

## Iron and Industrial Stocks

NEW YORK, July 7, 1915.

The stock market has been subjected to opposing influences. A favorable occurrence was the decision in the United States District Court in favor of the Reading Railroad Company, which had been attacked by the Government for the purpose of effecting a dissolution of its connection with leased railroad systems and affiliated coal companies. On the other hand were the attempted assassination of J. P. Morgan and a somewhat heavy selling movement by foreign holders of American securities. The announcement of a severe assessment on the stockholders caused a sharp decline in the Rumely Company's stocks. The prices of securities held up well in the face of the preponderance of unfavorable happenings. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com. 16½ - 18¼	Pittsburgh Steel, com. 89½ - 90½
Allis-Chal., pref. 52½ - 56¼	Pressed Stl, com. 47½ - 48½
Am. Can., com. 44½ - 47½	Ry. Steel Spring, com. 30½ - 30¾
Am. Can., pref. 101 - 102½	Republic, com. 29 - 29½
Am. Car & Fdy., com. 53½ - 54¾	Republic, pref. 87½ - 88
Am. Car & Fdy., pref. 113½ - 113¾	Rumely Co., com. 1½ - 4½
Am. Loco., com. 48 - 50	Rumely Co., pref. 5½ - 11½
Am. Loco., pref. 98½ - 98¾	Sloss, com. 34½ - 34¾
Am. Steel Fdries. 37 - 38½	Pipe, com. 13½ - 13¾
Bald. Loco., com. 64 - 69½	Pipe, pref. 37 - 37½
Bald. Loco., pref. 102 - 102½	U. S. Steel, com. 59 - 61
Beth. Steel, com. 166 - 171	U. S. Steel, pref. 109½ - 109¾
Beth. Steel, pref. 116 - 117	Westingh'g Elec. 97½ - 100½
Colorado Fuel, com. 30¾ - 32½	Am. Ship, com. 37 - 37½
General Electric, 167½ - 171½	Am. Ship, pref. 70 - 70½
Gt. No. Ore Cert. 34½ - 36½	Chic. Pneu. Tool. 57 - 57½
Int. Harv. of N. J., com. 98½ - 100	Cambria Steel, com. 48 - 48½
Int. Harv. Corp., pref. 99 - 99½	Lake Sup. Corp. 7 - 9½
Lackawanna Stl. 44 - 45½	Warwick, com. 31 - 32
Nat. En. & St., com. 17 - 17½	Cruc. Steel, pref. 89 - 91½
	Harb.-Walk. Refrac., pref. 98½ - 99
	La Belle Iron, pref. 103 - 103½

### Dividends

The New Jersey Zinc Company, extra 30 per cent, payable July 15.

The Harbison-Walker Refractories Company, regular quarterly, 1½ per cent on the preferred stock, payable July 20.

### Carrier Engineering Corporation

The Carrier Engineering Corporation has been incorporated at Albany, N. Y., with Willis H. Carrier as president and chief engineer; J. I. Lyle, treasurer and general manager, and E. T. Murphy, secretary, and with the principal office at 39 Cortlandt Street, New York. The company will take over all of the special air conditioning work of the Carrier Air Conditioning Company. The sale of Carrier air washers has been given to the sales organization of the Buffalo Forge Company. Mr. Murphy will supervise the Philadelphia office. The Chicago office will be in charge of A. E. Stacey, Jr., with E. P. Heckel as assistant manager. E. T. Lyle will remain in charge of the Boston office. L. L. Lewis, as heretofore, will be the engineer in charge of design and estimating.

The total production of explosives in the United States in 1914, exclusive of exports, according to figures compiled by Albert H. Fay, United States Bureau of Mines, was 450,251,489 lb., or 225,126 net tons, as compared with 500,015,845 lb., or 250,008 net tons for 1913. The production for 1914 is segregated as follows: Black powder, 206,099,700 lb.; "high" explosives other than permissible explosives, 218,453,971 lb., and permissible explosives 25,697,818 lb. The total amount of explosives used for the production of coal in 1914 was 220,622,487 lb., of which about 8.9 per cent was of the permissible class, as compared with 9.5 per cent in 1913.

The Olmsted-Flint Company, belting manufacturer, which on Jan. 1 began operations in its new factory at Cambridge, Mass., has opened a New York branch office at 37 Warren Street. The new office is under the management of the Benjamin S. Alder Company, manufacturers' representative, and a stock will be carried.



## Merchant Marine Additions

WASHINGTON, D. C., July 6, 1915.—The construction of merchant vessels in the United States in the fiscal year ended June 30, 1915, declined 30 per cent as compared with the previous year, the total being 1226 vessels, of 215,711 gross tons, as against 1291 vessels, of 311,578 gross tons. Domestic construction was supplemented the last ten months of the year by the transfer to the American merchant fleet, under the ship registry act of Aug. 18, 1914, of 147 foreign built vessels, of 528,907 gross tons, making the total for the year from both sources 1373 vessels, of 744,618 gross tons. While the Department of Commerce states that this tonnage is the largest annual addition to the American merchant marine in our history, it should be kept in mind that nearly 70 per cent of the new tonnage must be credited to an emergency statute, the effectiveness of which has already been exhausted.

The largest vessels constructed during the year were two colliers built for the Panama Canal trade, the Achilles and Ulysses, of 11,081 and 10,910 gross tons respectively. Of the total construction reported, 586 vessels, aggregating 166,215 tons, were built on the Atlantic and Gulf seaboard; 245 vessels, aggregating 34,984 tons, on the Pacific; 156 vessels, aggregating 10,248 tons, on the Great Lakes; 132 vessels, aggregating 4137 tons, on the Western rivers, while the remaining seven were small, averaging less than 20 tons each, constructed in Porto Rico and Hawaii. An item of unusual interest is the appearance in the statistics of two barges, averaging 282 tons each, constructed of reinforced concrete.

While there are still available for transfer to the American flag, under the act of Aug. 18, 1914, American-owned foreign built vessels, estimated to aggregate between 200,000 and 400,000 tons, it is extremely improbable that our merchant marine will be further recruited to any material extent from this source. The enactment by the last Congress of the so-called seamen's bill has not only put an end to this movement, but has already driven one American line to seek a foreign registry and others are likely to follow. It is also well known that a considerable number of vessels transferred to the American flag were brought over because of war conditions and are likely to change their registry as soon as peace is declared.

Administration officials have made it perfectly clear that the ship purchase bill, which was defeated at the last session, will be brought forward in the new Congress and urged with all the resources that can be commanded. The Secretary of the Treasury is already active in the campaign and will probably be in charge of the Administration's propaganda.

Much interest has been aroused here by the suggestion put forward by Senator Burton of Ohio for the upbuilding of the American merchant marine. He has just returned from an extended South American tour, and his plan contemplates an agreement between the United States and the leading Latin-American nations to pay generous subventions for the establishment and maintenance of steamship lines to carry the mails, payments to be based on speed. A bill will be introduced early in the coming Congress.

Semi-official reports received by Commissioner of Navigation Chamberlain indicate that there has been a marked revival of the shipbuilding industry since the beginning of the current calendar year. This improvement, however, is not likely to be reflected in the returns of vessels officially numbered before next October or November, as the construction period ranges from six to twelve months.

W. L. C.

The May statistics of imports and exports just issued by the Bureau of Foreign and Domestic Commerce of the Department of Commerce show a total value of exports of merchandise of \$273,768,093, against imports of \$142,284,851, making the excess of exports \$131,483,242. The May exports exceed by \$79,160,671 the largest May record previously made. The great change in our foreign trade in the past twelve months is shown by the fact that in May, 1914, imports exceeded exports by \$2,548,896.

## Reduction of High-Speed Steel Mill Scale

A method for the reduction of mill scale formed in the manufacture of high-speed steel is patented by F. M. Becket, Niagara Falls, N. Y. (U. S. 1,127,163). He smelts the scale with silicon as a reducing agent in an electric furnace, so that it is reduced to an alloy of approximately the same composition as the steel from which it came. Analyses of the mill scale and the alloy obtained by this silicon reduction are as follows:

	Mill Scale	Reduced Alloy
Tungsten, per cent.....	11.90	15.60
Chromium, per cent.....	2.90	3.40
Vanadium, per cent.....	0.49	0.43

The resulting alloys contain a high percentage of phosphorus and the product of direct reduction is low in tungsten. A preliminary acid treatment is said to obviate these conditions, removing most of the iron and nearly all the phosphorus. The scale is ground to 8-in. mesh and treated with sulphuric acid at normal temperature, or at from 50 to 70 deg. C. The residue is washed and smelted with silicon. A modification of the invention subjects the scale to a reducing operation with carbon before acid treatment.

## New Mill Supply Jobbing House

The Virginia Machinery & Well Company has entered the jobbing field with a stock of machinery and supplies, catering to hardware dealers, plumbers, machine shops, municipalities, mills and factories, contractors, railroads, etc., with offices and warehouses at 1319 East Main Street, Richmond, Va. It will also do a contracting business, drilling artesian wells, making test holes and borings; will sell and install water and lighting systems for manufacturing plants, contractors, etc. The president of the company, Charles F. Cole, has long been an officer of the Sydnor Pump & Well Company, Richmond, having active charge of correspondence, sales and contracts. The vice-president and manager, Charles R. Elan, has, for a number of years, been an officer of the Thomas Hardware Company of Suffolk and Lawrenceville, Va., in the mill supply and machinery business, prior to which he operated a machine shop of his own, having secured his technical training in mechanical engineering at the Virginia Polytechnic Institute. The company is open for agencies in its line.

The Bulletin of the National City Bank of New York says that trade of the United States with South America continues to improve. Exports to that continent in April were 20 per cent in excess of those for April, 1914, and the imports therefrom 47 per cent greater than in the same month of last year. Exports increased to Argentina, Brazil, Uruguay, Colombia, Venezuela, and Ecuador, while those to Bolivia, Chile, and Peru show a slight decrease. The imports show an increase in the case of every country of South America, those from Argentina increasing about 50 per cent, from Brazil 27 per cent, and from Uruguay 93 per cent. The slight fall in the exports to west coast countries is due to the general falling off in the purchasing power of that section due to the reduction of sales of their products to Europe, which is usually the largest purchaser of their exportable merchandise.

A Cleveland branch of the National Sales Managers' Association of America has been organized with a membership of about forty sales managers of leading manufacturing plants. Melvin Pattison, Brown Hoisting Machinery Company, has been elected president; A. C. Secrest, Hamilton-Kirby Company, first vice-president; G. W. Riley, Welsbach Company, second vice-president; G. G. G. Peckham, Ohio Buick Company, third vice-president, and James A. Grudd, Wilmington Fibre Specialty Company, secretary.

The iron-ore output of Algeria in 1913, according to data just issued, was 1,273,992 tons. The exports were 1,363,400 tons, against 1,232,979 tons in 1912 and 1,102,143 tons in 1911. Great Britain took 790,641 tons of the 1913 exports and Germany and Austria-Hungary 150,912 tons.

# Test of a Mill Drinking Water System

Securing Actual Performance Data in a  
Plant of the National Tube Company  
—Points to Be Considered in the Design

BY F. E. BROWN

The primary object in conducting this test was to secure information relative to the actual performance of a drinking water system operated under mill conditions. The installation tested has been in use at the Continental Works of the National Tube Company for a number of years and was designed to supply cool and filtered water to the employees throughout the plant at as many different points convenient to the workmen as practicable. From the results obtained it can be said that the idea of distributing drinking water in this way has proved highly satisfactory, both to the management and to the employees.

The refrigerating plant consists of an ammonia compressor, condenser coils and cooling tank similar to those used in ice plants, and if it were used for such a purpose it would have a capacity of approximately 10 tons per 24 hr. There are also an engine-driven circulating pump, filters and distributing lines.

City water is used and during the test it had an average temperature of 57 deg. Fahr. as it came from the service main. This water is first passed through a double cylinder filter and into a cork insulated cooling tank, measuring  $4\frac{1}{2} \times 7 \times 10$  ft., where it is cooled

bubbling type, do not flow continually, but are equipped with self-closing faucets. This reduces the quantity of water wasted to a minimum. The longest circuit, designated as A in the accompanying table, with 16 fountains, is 1990 ft. in length and supplies the power house, boiler house, rolling mills and hospital. The shortest circuit, with eight fountains, supplies the office and pattern shop. Another circuit, B, with eight fountains on 571 ft. of pipe, supplies the coupling, blacksmith and machine shops.

All the lines are of galvanized pipe and are covered with cork covering of what is known as ice water thickness. The fittings are also galvanized and are covered with specially molded cork insulation. The lines are practically all overhead and at each fountain form a U, dropping down to the faucet and rising again, so that there are no dead ends where the water can remain stationary. Consequently, when a drinking fountain is turned on, fresh water at the proper temperature is immediately available.

The apparatus used in making the test consisted of a thermometer, a pressure gage and a water meter inserted in the inlet and the outlet, respectively, of the

Test	Main Circuit				Branch Circuit A				Branch Circuit B			
	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4
Average quantity of supply water, gal. per hr.	1574.67	1518.30	1681.50	1802.95	273.80	266.00	289.30	308.30	326.80	312.30	347.20	372.10
Average quantity of return water, gal. per hr.	1394.50	1323.30	1485.20	1605.21	190.00	178.60	206.30	230.10	309.80	294.00	328.40	353.20
Average quantity of water used and wasted, gal. per hr.	180.17	195.00	196.30	197.74	83.80	87.40	83.00	78.20	17.00	18.30	18.80	18.90
Number of men supplied	798	801	804	768	296	297	307	263	98	97	97	100
Average consumption per man, gal. per hr.	0.226	0.243	0.244	0.257	0.283	0.290	0.270	0.290	0.173	0.188	0.193	0.189
Tons of refrigeration per man per hr.	0.00027	0.00027	0.00024	0.00027	0.00027	0.00031	0.00027	0.00031	0.00023	0.00027	0.00029	0.00033
Average velocity of supply water, ft. per min.	160.90	155.20	171.80	184.27	111.90	108.70	117.80	126.00	133.60	127.60	141.90	152.10
Average velocity of return water, ft. per min.	142.20	135.30	151.70	164.06	77.60	73.00	84.30	94.70	126.60	120.10	134.20	144.10
Average pressure of supply water, lb. per sq. in.	43.40	33.20	39.00	58.00	44.10	32.60	40.80	58.70	38.10	31.80	36.80	57.50
Average pressure of return water, lb. per sq. in.	23.40	17.10	19.40	34.00	24.80	16.00	20.10	36.70	29.60	23.90	26.90	44.60
Average pressure loss, lb. per sq. in.	20.00	16.10	19.60	24.00	19.30	16.60	20.70	22.00	8.50	7.90	9.90	12.90
Average temperature of supply water, deg. F.	48.00	46.75	48.00	48.00	48.00	46.40	47.20	47.60	48.80	47.50	48.00	48.40
Average temperature of return water, deg. F.	52.20	50.90	51.00	51.30	58.10	58.40	57.40	56.60	50.80	49.90	50.40	51.10
Average temperature loss, deg. F.	4.20	4.15	3.00	3.30	10.10	12.00	10.20	9.00	2.00	2.40	2.40	2.70
Average temperature of mill atmosphere, deg. F.	86.50	91.25	88.90	89.50	88.60	96.10	95.20	95.00	81.30	87.00	85.00	90.40
Average temperature difference between air and supply water, deg. F.	38.50	44.50	40.90	41.50	40.60	49.70	48.00	47.40	32.50	39.50	37.00	42.00

to the desired temperature by ammonia injected into approximately 1000 ft. of  $1\frac{1}{4}$ -in. extra heavy black ammonia pipe. An automatic regulating valve keeps the water in the cooling tank at a nearly constant level.

The ammonia compressor, driven directly from the main shaft of a horizontal steam engine, is a combined suction and pressure pump which aspirates the gas which is created from the expansion coils and then converts it into a liquid which is used as the cold-producing agent. The compressor itself is of the vertical, two-column, single-acting type.

The circulating pump is a vertical, single-acting, geared, triplex plunger pump designed for a capacity of 50 gal. of water per min. and for a pressure of 130 lb. per sq. in. This pump receives the water from the cooling tank through a 2-in. suction line and pumps it directly into a main distributing line of the same size. The water, after passing through the entire system, is then returned again to the cooling tank.

The distributing lines consist of a 2-in. main supply and return line with five 1-in. branch circuits of varying lengths to which 55 sanitary drinking fountains are connected. These fountains, while they are of the

supply and return lines on the main circuit, and also on circuits A and B. It was not thought necessary to take readings on the other branches, as they would naturally show similar results. The branches chosen were selected because A is the longest and B is one of the shortest circuits in the system.

The thermometers were all brass cased well thermometers with 2-deg. graduations. The pressure gauges used were standard test instruments with 1-lb. graduations, ranging from 10 to 300 lb. The meters used were of the piston type with direct continuous reading dials. To determine the atmospheric temperature at various points throughout the mill, standard full immersion chemical thermometers were used.

Records of the readings of each well thermometer, meter and pressure gage were taken every 15 min. and the readings of the mill thermometers were recorded every hour.

A summary of the information obtained is given in the accompanying table. It will be noticed that in each case four tests were made. These were conducted on four consecutive days and covered a long enough period to insure getting average results.



Probably the first thing that will be observed from these results is that the whole system was designed amply large. This was done to insure plenty of water and also to permit of circulating it at a comparatively low rate of speed. However, a full complement of men was not working at the time the tests were made, consequently the figures show a larger capacity for the system than is actually the case when the whole plant is working full. Attention is called to the uniformity of some of the items for all three circuits, notably the average temperature of the supply water which, of course, is the most important one.

On the other hand, there is considerable difference in circuits A and B between the quantities of water consumed per man, average pressure loss and average temperature loss. These differences are, of course, to be expected for two reasons. In the first place, circuit A supplies water in the boiler house, rolling mill, etc., where the men naturally drink more water than those in the coupling, blacksmith and machine shops, which are served by circuit B and where the work is not so hot. Second, the pressure and temperature losses are easily accounted for by the difference in the length of the two circuits.

Experience indicates that the men prefer the water at a temperature somewhere between 44 and 48 deg. F. in summer and from 50 to 52 deg. in winter. It can also be safely estimated that in summer from 0.22 to 0.30 gal. of water per man per hr. will be consumed in steelworks and rolling mills, or where other comparatively hot work is performed. The amount of refrigeration under the same conditions will average from 0.00027 to 0.00040 tons per man per hr.

In order to regulate the flow of water and thus insure a uniform temperature throughout the system, a thermometer and a gate valve should be inserted at the return bend of each circuit; and it has been found that a velocity of not more than about 185 ft. per min. gives the best results. Dead ends, or places where the water will remain stationary, should always be avoided, and the drinking fountains should always be located with this in view. Long sweep fittings and bends should also be adhered to as much as possible in order to reduce the friction losses, and, as there naturally will be quite a number of bends in a system of this kind, the question of friction losses becomes quite important.

### Exposition Medals Cannot Be Photographed

According to dispatches from San Francisco, the exposition officials are in receipt of a letter from the Director of Mints, Washington, D. C., in which it is stated that the Solicitor General and officers in the secret service hold that the making of photographs of medals and diplomas awarded to exhibitors at the Panama-Pacific Exposition would come under the law which prohibits the reproduction by photograph or otherwise of United States coins and securities. It appears that the medals and diplomas for the exposition were struck off and printed in the United States mints and the department of engraving and printing. If reproduction of these proofs of awards is to be allowed, Congress, it is stated, will need to pass a law exempting such medals and diplomas under the law.

By an arrangement effective July 1, the scope of the American Steel & Wire Company's Philadelphia sales office was broadened to include all its lines of merchandise. Previously a specialty had been made of electrical wire and wire rope. All orders and correspondence relating to sales questions are to be addressed to the American Steel & Wire Company, Pennsylvania Building, Philadelphia, and plans have been made so that orders will be distributed direct to the company's mills from Philadelphia, in most cases saving a day's time.

The Brock Wrench Mfg. Company, 18 Dey Street, New York, has disposed of its interest in the manufacture and sale of the Brock standard wrenches to Greene, Tweed & Co., New York, who will continue the manufacture and sale of the line of chain and flange wrenches.

### Diesel Engine Day at the Exposition

The Panama-Pacific International Exposition set aside June 21 as Busch-Sulzer Brothers-Diesel Engine Day and it was celebrated in the center of the Palace of Machinery. A few Exposition flags were draped over the Busch-Sulzer Brothers engine and plants and trees formed a background for the speakers' platform. A squad of marines stood guard at the corners of the space, and the attendants of the engine company were as usual in their white uniforms, together with four girls in dainty apparel with bouquets of pink roses outlined against the black background of the engine, formed a picture that has not been duplicated in Exposition events.

The formal exercises were preceded by selections by the Marimba Band of Guatemala, who gave their regular afternoon concert through the courtesy of the Guatemala Exposition Commission at the Engine Company's space.

Lieut. George W. Danforth, chief of the department of machinery, was chairman of the day. He outlined briefly that the Engine Company had received the first permit as an exhibitor to start work, was the first of all the exhibitors to break ground and that in opening the Exposition, President Wilson started the engine by wireless connection from Washington, D. C. He introduced Charles A. Vogelsang, representing President C. C. Moore of the Exposition and he in turn presented W. S. Heger, Pacific Coast representative of the Busch-Sulzer Brothers-Diesel Engine Company, with a commemorative bronze medal as a token from the Exposition authorities.

Mr. Heger, in the course of his address, explained that the American rights were purchased by Adolphus Busch and the first engine was completed in September, 1898. This engine was placed in operation under commercial load and was the first Diesel engine so operated. In 1911, Mr. Busch purchased the American Diesel Engine Company and organized the present company, associating himself with the late Dr. Rudolph Diesel and Sulzer Brothers of Winterthur, Switzerland.

There are at present in operation in the United States, he said, 70,000 hp. in stationary Diesel engines and there are 500,000 hp. in operation abroad. The Diesel engine is manufactured in sizes from 120 to 4000 hp. The total expense of operating the engine at the Exposition, he added, 500 hp. for one hour, is less than 68c. for fuel and lubricating oil. The cleanliness of operation he also emphasized.

Lieutenant-Commander Woodward, naval aide to the president of the Exposition, gave a short address on the use of the Diesel engine in the Navy, and Guy L. Bailey, chief mechanical and electrical engineer of the Exposition, drew a comparison between the Diesel engines and explosion engines. A final selection of the band preceded the starting of the engine by the four young ladies who started the giant pile driver which drove the first pile on the Exposition site more than a year before.

### Spectroscopic Analysis of Steel

At the request of the steel industry the United States Bureau of Standard, Washington, has been devoting some time to an investigation of analyzing steel quantitatively by spectroscopic methods. It has been possible to show the presence of appreciable amounts of molybdenum, cobalt and vanadium in steels said to be free from those elements. No sample of iron has been found free from magnesium or copper, though the amount is small in unfused electrolytic iron. Silicon was not detected in electrolytic iron that had not been fused, but all other irons showed silicon as well as copper, manganese, nickel, cobalt and chromium.

The Ohio Corrugating Company, Warren, Ohio, has placed its new plant in operation. It will manufacture roofing and siding, stove pipe, eaves-troughs, conductor pipes, metal shingles, metal ceilings, and other sheet metal products. W. Manning Kerr is president and treasurer; C. H. Riegel, vice-president, and I. A. Foltz, secretary and manager of sales.



## POWER HAMMER EQUIPMENT

### Points To Be Considered in Purchasing—Improvements Made in the Design

BY C. A. TUPPER

Ask the average shop man what improvements there have been in the design or use of power hammers and he would probably be unable to think of many; yet the progress of the past few years has been very appreciable. In choosing a power hammer, the first consideration is to determine whether it will be used for work of a general character, as in an engineering or jobbing plant, or whether it is intended for specialized service. Next are the items of floor space, headroom under gallery or shafting and the character and position of the drive.

If cold as well as hot forgings are to be attempted, and perhaps some sheet metal work, the construction will need to be heavy and rigid, having the weight and strength concentrated in line with the working stresses, and provision made for a number of points of shock absorption. For crowded shops compactness is a good feature, but this, naturally, is not desirable where it has to be obtained at the expense of other necessary qualities.

#### PRESENT DAY DESIGNING PRACTICE

There is a tendency, as in most other lines, toward greater speed of operation and with power hammers of modern design this can readily be obtained. A quick-acting roller clutch, with positive ratchet and stop, steel back gearing and bronze bushed bearings, are features of the best practice. For quick service, with varying material, hammers should also be arranged so that bars of any length can be worked either way of the dies. In changing the stroke, there are several methods used, including special fitting of the crank pin, which enable a hammer to be run very rapidly on light or heavy work.

Nicety of control forms an important element in power hammer operation and enables just the right kind of a blow to be struck, with proper force, to insure the best results on work of different kinds. This is particularly true for plating, drawing, swaging, collaring, spindle and general tool making and for any forging requiring a quick, snappy blow. It is also desirable to have a hammer arranged so that it will deliver effective blows alternately on metal of varying thicknesses forming parts of the same piece, without any change in the adjustment.

Another essential for good work is that the ram should run smoothly in its ways and be accurately guided. For this the wearing parts must be both adjustable for wear as with tightening gibs and also replaceable. Granted such provision, there are various expedients for insuring a square blow in operation. One manufacturer suspends the ram on a flexible belt, usually of leather, and this belt is attached to the ends of a semi-circular steel spring. The latter, at its upper part, is in turn connected by a rod with a crank pin, which, being set in motion by a belt from shafting, raises and lowers the ram in the guides. The speed and force of the ram are regulated by a friction pulley under the control of the operator.

There has been a gradual lengthening in the stroke of the more powerful hammers, with enlargement of the space under the frame. Driving pulleys are also larger than formerly, in line with the common experience that less power is consumed in bending a wide belt over a pulley of liberal diameter. Belting should be of oak-tanned stretched leather, double thickness, and must have an occasional application of neatsfoot oil or other satisfactory lubricant. Shafts are necessarily of forged steel but the anvil blocks should be wrought iron.

#### INSTALLATION AND OPERATION PRECAUTIONS

A stone or concrete foundation should be provided, with a timber block cushion of 8 to 14 in. between the foundation and the hammer frame. The depth of the

foundation should be 3 to 4 ft. even for a hammer as light as 25 lb., and solid enough for the heavier machines to guard against excessive vibration. It ought also to be set as far as possible from railroad tracks, or powerful steam hammers, on the one hand, and from machine tools on the other, as the work of both may be affected, respectively, by the jars and vibrations from either cause.

When it comes to operation, even with the same types of machines, practice in different industries and shops will vary widely according to experience. The blacksmith working with iron or steel would find himself lost in attempting the functions of a coppersmith or of those who forge parts from other primary metals and alloys. Manufacturers of automobile, carriage or machine tool parts each have their respective problems to contend with, which are different from those experienced by makers of files, cutlery and edge tools. The latter, again, find their needs and methods quite distinct from producers of field implements, shovels, construction or trenching tools, etc. Even the terms "light" or "heavy" have innumerable shades of meaning when applied to hammer blows. The quick, light blow required by metal workers for striking up tin, copper, iron or steel laminations not only varies in degree and application with the precise nature of the sheet but also differs entirely, for example, from the light blow used by saw makers to reduce the fash left by toothing. Again the blow known to shovel makers in cold hammering their molds to stiffen or finish them, has a feeling very different from any other and examples might be cited indefinitely.

#### EXPERIENCE TO BE RELIED ON MOST

Experience is the only safe guide, and in selecting a new hammer it should be given more weight than any number of apparent but untried advantages. This is not to say, however, that the latter are not to be thoroughly considered. Every improvement claimed by manufacturers of power hammers ought to be tested out for the particular service under discussion and the prospective user governed accordingly in his choice or, at least, trial. A good general guide is the question as to where the hammers are being used for similar service, under what conditions and by whom. In the final decision, also, the factors of good wear, low expense for repairs, quick operation, practical assurance of freedom from breakdown and the possibility of increasing output, where the last named is desirable, should far outweigh any difference in first cost.

Small bracket hammers for use in the manufacture of small saws and other light products are usually hand operated, with motor drive for the heavier, but still light, sheet metal work of many industries. For the more powerful hammers set on foundations, especially where standard forgings are to be turned out in quantities, direct electric drive, preferably with interpole motors, is an economy both of power and operating time. In this case rheostatic control, with the proper weight of hammer, height of drop and other factors mentioned above can be made sufficiently flexible to serve all ordinary purposes; but for fine work or intermittent service belt drive is best.

A new semi-monthly mechanical engineering journal has been established in Russia, known as the *Vestnik Ingenerov*. It replaces two other engineering journals, one published by the Polytechnical Society of Moscow and the other by the Technical Society of Petrograd. R. Poliakov, assistant professor and lecturer in mechanical technology in the Imperial Technical Institute of Moscow, is one of the editors. The journal in its purpose, scope and appearance is much like the *Zeitschrift* of the German Society of Engineers.

The National Slag Company announces the removal on July 1 of its offices from 30 Church Street, New York, to the Kinney Building, Broad and Market streets, Newark, N. J. The works are at South Bethlehem, Pa., and the main office in the Pennsylvania Building, Philadelphia, Pa.

## Judicial Decisions

ABSTRACTED BY A. L. H. STREET

**CONTRACTS BY CORRESPONDENCE.**—A valid contract may be formed by a series of letters passing between the parties, and hence, when correspondence shows a final agreement on the terms of a sale, an ineffectual attempt to reduce the contract to a formal written agreement does not affect the right of either party to have the contract performed according to the terms expressed in the correspondence. (Texas Court of Civil Appeals, *T. C. Bottom Produce Company vs. Olsen*, 175 Southwestern Reporter 126.)

**NECESSITY FOR RECORDING CONDITIONAL SALE CONTRACTS.**—Where machinery was sold f.o.b. cars, Indianapolis, for shipment to a point in Ohio, where it was to be installed, under agreement that title should remain in the seller until payment of the price, the seller could not reclaim the machinery on the buyer becoming bankrupt, if the contract was not recorded in Ohio. When the law requires conditional sale contracts to be recorded, in order to be valid against the buyer's creditors, necessity for recording is not avoided in Ohio, as against the buyer's trustee in bankruptcy, by attaching a notice to the machine sold, to the effect that title is retained by the seller. (United States Circuit Court of Appeals, Sixth Circuit, Massachusetts Bonding & Insurance Company vs. Kemper, 220 Federal Reporter 843.)

**IMPLIED WARRANTY OF MACHINERY.**—A manufacturer of a comparatively new machine for automatically tapping nuts impliedly warranted that the machine would suitably work the stock used by the buyer, where the latter had no opportunity before buying to inspect a machine of the type bought, the seller had advertised that the machine would automatically tap hot or cold pressed nuts and knew the purposes for which the particular machine was bought. (United States Circuit Court of Appeals, Sixth Circuit, Kansas City Bolt & Nut Company vs. Rodd, 220 Federal Reporter 750.)

**PHASES OF PATENT LAW.**—A person who owns an undivided interest in a patent cannot restrain his co-owner from manufacturing devices under the patent, or from authorizing other persons to do so. (United States Circuit Court of Appeals, Seventh Circuit, Central Brass & Stamping Company vs. Stuber, 220 Federal Reporter 909.) When a patent is granted to two persons jointly, each becomes the owner of an undivided one-half interest, with the right to use the invention without accounting to his associate. (Same court, *Drake vs. Hall*, 220 Federal Reporter 905.) Substitution of one kind of well-known material in the production of a device for another does not constitute patentable invention, unless some genuine benefit to the art or the public results therefrom. (United States Circuit Court of Appeals, Second Circuit, Columbia Metal Box Company vs. Halper, 220 Federal Reporter 912.)

**AWARDS UNDER NEW YORK COMPENSATION ACT.**—A finding by the New York Workmen's Compensation Commission as to the nature of an iron worker's injuries is a decision on a question of fact that is conclusive and not reviewable by the Appellate Division of the Supreme Court. (New York Supreme Court, Appellate Division, *Goldstein vs. Centre Iron Works*, 153 New York Supplement, 224.) A one-armed employee who loses the other hand in the course of his employment is entitled to an award as for total disability, although the accident in which the first hand was lost was outside the particular employment. (Schwab vs. Forestry Company, page 234.)

**LIABILITY OF KENTUCKY MANUFACTURERS.**—The Kentucky statute which gives a lien against the assets of "any owner or operator of any rolling mill, foundry, or other manufacturing establishment," to employees and to persons who have furnished supplies for carrying on the business, on distribution of such assets, is constitutional and extends to all manufacturing establishments. (United States Circuit Court of Appeals, Sixth Circuit, Central Trust Company of Illinois vs. George Lueders & Co., 221 Federal Reporter, 829.)

## May Exports of Iron and Steel

Following are the statistics of the exports of iron and steel products from the United States in May, 1914, and 1915, for which weights are given:

	1914. Gross tons	1915. Gross tons
Pig iron .....	11,726	18,581
Scrap .....	3,411	1,050
Bar iron .....	359	2,394
Wire rods .....	6,321	11,236
Steel bars .....	10,151	37,260
Billets, ingots and blooms, n.e.s. .	6,872	48,391
Bolts and nuts .....	1,401	1,272
Hoops and bands .....	968	1,578
Horseshoes .....	122	865
Cut nails .....	661	376
Railroad spikes .....	1,075	264
Wire nails .....	2,363	6,459
All other nails, including tacks. .	311	726
Cast pipes and fittings .....	16,356	6,393
Wrought pipes and fittings .....		16,144
Radiators and cast-iron house heating boilers .....	358	144
Steel rails .....	15,659	16,646
Galvanized iron sheets and plates	2,851	6,446
All other iron sheets and plates. .	812	1,348
Steel plates .....	8,462	16,333
Steel sheets .....	16,559	10,122
Structural iron and steel .....	14,722	14,072
Tin and terne plates .....	4,695	7,307
Barb wire .....	5,337	18,182
All other wire .....	7,062	19,165

## Silica-Graphite Paint for Boiler Drums

A practice that is fast gaining adoption in power plants is the use of paint for the inner surface of steam boiler drums for protection against pitting. Silica-graphite paint has been found especially desirable for this purpose. The manufacturers of this paint have for several years coated the steam drums of five B. & W. boilers developing 1800 hp. and as a result the drums are in almost perfect condition. Another instance mentioned is that of a plant equipped with B. & W. boilers developing 8400 hp.; the interiors of the drums were scalded, painted both above and below the water line and the coating was allowed 48 hr. to dry. This treatment was repeated every 10 months, and not only did it stop pitting but whereas previously six men had taken seven days to clean the drums of one boiler, two men now clean them in a day. This latter experience is quoted from a letter of the chief engineer of the New York Life Insurance Company in the April issue of Graphite.

## Speedometer Registering Maximum Speed

For use particularly on commercial motor vehicles the Corbin Screw Corporation, New Britain, Conn., has brought out a type of speedometer a feature of which is an individual red maximum speed hand to register the highest speed made in a day or trip. The hand remains at the point until the locking mechanism operated by a key returns it to zero. The device, it is pointed out, not only serves as a check on the drivers of vehicles of this nature, but also as a protection from false speed charges.

The slogan "Safety First," it is emphasized in the monthly publication of the general safety committee of the Raritan Copper Works, Perth Amboy, N. J., threatens to become as familiar as any of the curt phrases which advertisers have kept prominently before the public eye. The precept is worthy of universal acceptance, but a danger arises, in that its too common use illegitimately will establish it as a meaningless phrase of pleasing euphony, perhaps, but side-tracking the implied truth that safety first is really "Thinking First."

Five KisselKar auto trucks have been driven more than 50,000 miles each in the service of Alexander H. Revell & Co., furniture dealers, Chicago. They are reported still in fine running condition, despite the fact that they are submitted to the hardest kind of road work, both urban and suburban.



## OBITUARY

OLIVER P. MECKEL died at Brockville, Ontario, Canada, June 28, of heart failure, aged fifty-one years. For more than twenty-eight years he was connected with the Baird Machinery Company, Pittsburgh, entering its employ in a minor capacity and later traveling extensively. He severed the connection January 1 last on account of ill health and went to his summer home on an island in Alexandria Bay. He leaves his widow, one daughter and one son.

PETER G. TOEFFER, head of the W. Toepfer & Sons Iron Works, Milwaukee, Wis., died at a local hospital July 2, aged fifty-nine years. He was a son of the late Wenzel Toepfer, who established the business sixty years ago. Mr. Toepfer was a chess player of national reputation. He leaves his widow.

## PERSONAL

Edwin A. Stillman, president Watson-Stillman Company, New York, has been appointed a member of the committee on hydraulic flanges of the American Society of Mechanical Engineers.

William T. Hensley, formerly associated with the Westinghouse Electric & Mfg. Company, has been appointed consulting engineer for the American Rotary Valve Company, Anderson, Ind.

Charles M. Spofford, Fay, Spofford & Thorndike, consulting engineers, Boston, and head of the department of civil and sanitary engineering, Massachusetts Institute of Technology, has been appointed by Governor Walsh of Massachusetts as one of the commissioners "to investigate the subject of terminal facilities and the improvement of facilities for the transportation of freight in the metropolitan district."

Fred C. Carstarphen, mechanical engineer of the American Steel & Wire Company at Trenton, N. J., is second vice-president of the Engineers' Club of Trenton. Among the directors are Frank J. Epple, general manager Trenton Malleable Iron Company; Alfred P. S. Bellis and Frank W. Bunn, mechanical engineers, John A. Roebling's Sons Company, and Frank W. Kennedy, general manager DeLaval Steam Turbine Company.

Thomas R. Cook, formerly assistant engineer of motive power, Pennsylvania Lines West, Pittsburgh, has been appointed chief engineer of the Willard Storage Battery Company, Cleveland, Ohio.

Ronald C. Hands, until recently connected with the planning and efficiency work of the Bridgeport Brass Company, has joined the Winchester Repeating Arms Company, New Haven, Conn., as assistant to the supervisor of the mechanical division.

William E. Choate has been appointed manager of the Advance Machine Company, Boston, Mass.

John E. Lord has been appointed manager of the Chicago office of the Nordberg Mfg. Company.

W. M. Wyeth, formerly with the United States Metal & Mfg. Company, has been appointed representative of John J. Caine, in New York City and vicinity. He will have his headquarters at Mr. Caine's new office, 1206 West Street Building.

George I. King, Middletown Car Company, Middletown, Pa., has returned from a business trip to Russia and France, where he succeeded in obtaining important orders for the company of which his father, Arthur King, is president.

Russian imports of merchant iron and steel, tin plates, sheets and wire products in 1914 were 39,700 metric tons, against 52,300 tons in 1913.

## Pittsburgh and Nearby Districts

The stockholders of the Wheeling Steel & Iron Company, Wheeling, W. Va., voted June 30 to issue bonds to the amount of \$5,000,000 for plant improvements and betterments. The proceeds are partly to be used to construct at Benwood, W. Va., a combination sheet-bar and skelp mill, which will enable the company's excess steel ingot production to be put in more finished form; to remodel the Benwood tube mill and to enlarge the tin-plate mills at Yorkville, Ohio.

The Vanadium-Alloys Steel Company, Pittsburgh, manufacturer of high-speed tool steel, also carbon and alloy steels, is now in a position to furnish ferrotungsten.

The Pittsburgh Steel Company on July 1 purchased, canceled and retired a considerable number of its coupon notes of the issue of Jan. 1, 1915. These notes would not have matured until Jan. 1, 1918.

The Knox Pressed & Welded Steel Company, with executive offices in the Farmers Bank Building, Pittsburgh, and works at Sharon, Pa., has purchased thirty acres at Wheatland, Pa., half way between Sharon and Farrell, and within a short time will erect an entirely new manufacturing plant. The main building will be 74 x 500 ft., with a 40-ft. lean-to the entire length of one side of the building and a riveting tower on the opposite side. The company is greatly increasing its capacity for the production of welded plate work, and the new installations will include a line of equipment for heavy riveted work. The company is also contemplating in the near future the installation of several heavy duty hydraulic presses.

The contract has been let for the erection of a new office building for the Petroleum Iron Works Company, Sharon, Pa. It will be constructed of pressed brick, 42 x 120 ft., two stories, with a finished basement. It will cost about \$30,000 and will be ready for occupancy in November.

## Columbus Bolt Works Reorganized

The Columbus Bolt Works Company, Columbus, Ohio, has been incorporated with a capital stock of \$660,000 to take over the business of the Columbus Bolt Works. J. R. Poste, J. H. Poste, W. F. Burdell, Beale Poste, and F. H. Barrett are the incorporators. J. R. Poste has been elected president, treasurer, and general manager; J. H. Poste, vice-president; T. A. Fleming, assistant treasurer, and H. A. Mason, secretary. The control of the company is now in the hands of J. R. Poste, formerly secretary and general manager of the works.

The company now operates three plants. The bolt department is located in a five-story reinforced concrete building in West Chestnut Street; the forging department occupies a building at Randolph and Gorman streets, and the pressed nut department is housed in a concrete building in Dennison Avenue. Julius Blum & Co., 510 West Twenty-fourth Street, New York, have been appointed Eastern sales agents.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has taken two large orders for hydraulic turbines, one of which is for three 12,500-hp. turbines for the Canadian Niagara Power Company, Niagara Falls, for extensions to its plant, and the other is for three 2200-hp. vertical turbines for the Oswego Falls Pulp & Paper Company, Fulton, N. Y. Westinghouse generators will be installed in connection with the turbines. The company has also recently taken a large order for gas producers and considerable other business in its various departments and is now well filled with work for the remainder of the year.

Allison & Co., Chester, Pa., manufacturers of steel forgings, castings and bars, and of the Gantt patent furnaces for forging and treating steel, have discontinued their Boston office, which was in charge of L. N. Perrault, and hereafter will handle their business in New England direct from the main office at Chester. Traveling representatives will be sent from the main office.



## Customs Decisions

### HACK SAW STEEL

Adverse action has been taken by the Board of United States General Appraisers in claims made by the W. N. Procter Company, Boston, against the collector's classification under the present tariff of merchandise invoiced as "hack saw steel." The merchandise was imported in pieces 6 ft. long, 16 in. wide, and 0.032 in. thick. Duty was levied at 15 per cent. under paragraph 110, as crucible steel sheets containing an alloy, while the importers claimed a rate of 12 per cent. under paragraph 105 as hack saw steel. It was testified that the merchandise was imported for the Massachusetts Saw Works, Springfield, for the purpose of being manufactured into hack saws. It was further testified that the material contained 1 1/4 per cent. of an alloy of tungsten, and that by reason of this alloy and the size and thickness of the sheets it was peculiarly adaptable for making hack saws. There was no testimony, however, to show that the steel is commercially recognized as hack saw steel, or that it is commercially not suitable for other uses than for manufacturing hack saws.

### GEAR WHEELS AND WORMS FOR MOTOR CARS

The Timken-Detroit Axle Company, Detroit, was sustained in a contention relating to special machine cut high tensile steel worms and special machine cut phosphor bronze worm wheels. The articles are unfinished parts of automobiles. The collector exacted duty at 30 per cent. under the present tariff as "finished parts of automobiles," while the articles were claimed properly dutiable at 20 per cent. as manufactures of metal not specially provided for. It was brought out that the parts are imported in a more or less blank state and the work of fitting them done in this country. In reversing the collector, the decision held that the articles are by no means in a finished condition and therefore do not respond to the requirements of the provision for finished automobile parts.

### WINCHES AS SHIP EQUIPMENT

W. G. Sickel, representing the Hamburg-American Line, protested the assessment of duty on 12 electric winches brought into this country by the steamship company in its vessel Pennsylvania for use on its steamer Christian X. It was claimed that the winches are free of duty as ship's equipment under the provisions of section 17 of the act of March 3, 1897, amending No. 2797 of the revised statutes. The board held that the present case differs in no material respects from a similar case decided adversely to the same protestants sometime ago by the customs court. The assessment was affirmed.

### SEWING MACHINE PARTS

The board refused to upset the classification imposed by the collector at New York on importations of sewing machine parts made under the act of 1909. The merchandise consists of parts, some of cast iron and some of malleable iron, but all of which have been machined and nickel-plated. The Durbrow & Hearne Mfg. Company, the importer, claimed that the articles had not been machined or nickel-plated, and asked for a rate lower than assessed. It was decided that the parts must stand duty at 45 per cent. as manufacturers of metal not specially provided for.

### COPPER-ZINC ORE

The board handed down a decision interpreting the ore provisions of the tariff act of 1913, important to smelting interests.

The United States Metals Refining Company imported copper ore containing zinc varying from 3.60 to 7.30 per cent. Duty was levied on the zinc content at the rate of 10 per cent.—upon an appraised valuation thereof at 4c. per lb.—under the provisions of paragraph 162. The importer went before the lower customs tribunal with the claim that the ore is properly entitled to free entry under paragraph 461 on the ground that the quantity of zinc contained therein is negligible and not capable of being recovered or used. Counsel for

the Government asked that the collector's assessment be affirmed by the board on two grounds—that inasmuch as the zinc content was appraised at 4c. per lb., it cannot now be held to be of no commercial value, and that the provisions of paragraph 162 were intended to apply to and cover the zinc content as found in the ore in its imported condition, without reference to the quantity thereof which may or may not be determined to be commercially recoverable. Judge Fischer, in his decision for the board, dismissed the first objection as of no weight, but upheld the second point made by the Government counsel, thus overruling the protest. It is expected that the Metals Company will take an appeal to the customs court.

## The German Steel Trade in May

The statement of the German Steel Works Union, issued after its regular meeting on June 10, 1915, gives the following general review of conditions in the German steel trade:

In semi-finished steel the conditions have changed but little since last month and specifications continue at about the former level. Prices for the third quarter were advanced 5 marks (\$1.19) per ton because of the increasing cost of production. Export business has naturally, because of recent political events, suffered a further curtailment.

In railroad permanent way material, the Wurttemberg State Railways have placed their principal orders for 1916, exceeding those of last year by several thousand tons, though below the level of former years. From neutral countries some good contracts have been received. Business in grooved rails is quiet, but in mine rails the domestic demand is satisfactory, with exports small.

Domestic demand for shapes was less in May than in April, and an increase is not expected because of dullness in building trades. Prices for the third quarter were advanced 10 marks (\$2.38) per ton owing to higher cost of production. Conditions in the export trade are unchanged, though the demand in May was greater than in April.

## Iron-Ore Output of Alsace-Lorraine in 1914

The iron-ore output in Alsace-Lorraine showed a decided reduction in 1914, being only 14,021,279 metric tons, or 33.66 per cent. less than in 1913 when it was 21,153,554 tons. There were 50 mines employing 12,124 persons against 48 mines employing 17,713 persons active in 1913. The sales of iron ore from pits in that country aggregated 13,938,594 tons, as compared with 21,153,328 tons in 1913, the destinations being as follows:

	1913 Tons	1914 Tons
Alsace-Lorraine	11,780,964	7,385,682
Saar	2,812,418	1,864,654
Lower Rheinland-Westphalia	2,909,606	2,201,462
Luxemburg	2,896,226	2,102,895
France	517,079	287,662
Belgium	237,035	96,149
South Germany		90
Total	21,153,328	13,938,594

The output of coal was 2,856,780 tons in 1914, against 3,795,932 tons in 1913, a decrease of 24.74 per cent. Coke produced in 1914 was 50,887 tons compared with 91,745 tons in 1913, a decrease of 44.4 per cent.

Some thirty-three electric locomotives were placed in service in November, 1910, by the Pennsylvania Railroad on the Manhattan Division to handle trains between Manhattan Transfer, N. J., and the station in New York City through the tunnels under the Hudson River. These locomotives have therefore at the present time been in service more than fifty-five months. In the first four years of service which ended Nov. 28, 1914, the locomotives had run 3,974,746 miles, with a total number of engine failures of forty-five. In this time 463,558 train movements were made which gives an average of 10,361 movements per detention. The number of miles run by the locomotives per detention was 88,328 and total train detention was 271 min.

# Machinery Markets and News of the Works

## DELIVERIES LIMIT SALES

### Second-Hand Tools Selling at a Premium

Canadian Orders for 107 Lathes for October 15 Delivery—Some Lathe Builders Offer Only February Invoices

In spite of distant deliveries, domestic inquiry shows great variety and life. It is more searching and is quickly gathering up all good second-hand tools. Machine tool prices have now risen so much that both dealers and manufacturers are now discounting the re-sale of their tools in the future. Advancing prices and remote deliveries have in some cases forced the small shops to buy second-hand tools, and in other instances to postpone purchases.

Chicago reports an unusual demand for forging equipment. The call for locomotive cranes is quite active in Cleveland, and railroads and steel plants are seeking car-dumping machinery of larger capacity to keep pace with increased operations. The Cleveland plant of the General Electric Company is in the market for screw, drilling, and two large planing machines. The Timken Roller Bearing Company, Canton, Ohio, is purchasing machinery for its new cold drawing steel plant. The American Rotary Valve Company, Anderson, Ind., is buying tools for the manufacture of universal joints.

The General Vehicle Company, Long Island City, N. Y., and the Four Wheel Drive Auto Company, Clintonville, Wis., have both bought additional equipment, and it is now generally realized that the automobile manufacturers have purchased a great deal more machinery than has been supposed. An order for \$160,000 worth of automatic screw machines was recently placed in Ohio. Among the railroads the Santa Fe and the Burlington have placed orders for most of their requirements, but the latter is still in the market. Steel foundries are for the most part working at full capacity turning out machine-tool parts.

Foreign inquiry for lathes and certain milling machines is steady in the face of further postponed deliveries. Some lathe builders can promise only next February delivery. Canadian inquiry is plentiful, and two orders for a total of 107 engine lathes were placed in Cleveland for delivery Oct. 15. The Truro Engineering Works, Truro, N. S., Hepburn Brothers, Picton, Ont., and the J. C. Wilson Company, Glenora, Ont., are all in the market for shell-making machinery. The American Can Company is figuring on a large shell order. The C. Lee Cook Mfg. Company, Louisville, Ky., has received a large order from the Hamilton Machine Tool Company, Hamilton, Ohio, for 24-in. engine lathes for shipment abroad. The Shroeder Headlight Company, Evansville, Ind., has a rush order from the Russian Government for 400 headlights.

Requests for a variety of miscellaneous equipment come also from countries abroad. Japan orders a steam hoist, originally placed in Germany. Norway inquires

for pneumatic locomotives and steam engines. London is reported to have ordered 20,000 gross of steel knives and forks from the Baltimore plant of the National Enameling & Stamping Company. A Russian inquiry is for a complete steel barrel-making plant. In Cleveland conveying equipment—cranes, hoists, etc.—have developed a very good foreign demand.

The Canadian Car & Foundry Company is erecting four buildings at Kingsland, N. J., near New York, for storing and assembling shells for its Russian contract. The Tubular Products & Steel Works is building a plant for the manufacture of high carbon butted steel tubing at Reading, Ohio. At Hamilton, Ohio, the Mosler Safe Company and the Herring-Hall-Marvin Safe Company are both making additions.

## New York

NEW YORK, July 7, 1915.

In point of inquiries received, the past week has been one of the liveliest of these busy times with machine-tool representatives. More big war inquiries are out, and in addition there is a great deal of shopping-around on the part of persons or firms who would like to get in a position where they could take shell contracts. Several ordinary domestic inquiries, mostly for one to three tools have come out, but they usually are withdrawn when the far-off deliveries are stated.

More talk is heard of shell contracts which have a long period to run. In one case a company inquiring for machine tools says it can get a contract which will allow forty weeks for the completion of its plant, twelve weeks in which to turn out the first product, and two years in which to fill the order. Others say they have from two to three years in which to fill shell orders. They must have a long time if they are to buy machine tools, and almost every firm would have to buy. It has been reported that the American Can Company is estimating on a very large shell order. It has a large and well-equipped machine shop in Syracuse, N. Y., where it manufactures its own machinery. The company confirms that it has negotiations under way which may result in a big contract being secured, but that none has been taken as yet. Many questions, including that of labor, are being considered.

The Canadian Car & Foundry Company, which has a large and exclusive contract with Russia, has leased six acres of meadow land at Kingsland, Union Township, N. J., and will erect four buildings for storing and assembling shells and their parts made by American firms who have sub-contracts with the Canadian company. The locality was selected for the reason that it is a better shipping point than Montreal. Its nearness to New York will mean a saving in freight rates.

Though no definite details are available at this time, it is known that an Italian commission is now in this country and that it is interested in an inquiry for shells for the Italian Government. An Italian bank in New York is associated with the commission in the inquiry. Representatives of Greece are also in this country, and it is reported that they are seeking to place a contract for a large number of rifles.

As for exports, they continue good with England, France, Italy, and Russia, but business is hampered, of course, by the inability to get deliveries as quickly as they are wanted. The delivery problem is worse than that of getting ocean freight space.

Dealers in second-hand machinery continue to scour the country for used tools, and some very old machines are coming to light. Good used machine tools are scarcer than ever, and when found are quickly sold.

An Ohio maker of automatic screw machines recently sold \$160,000 worth of tools of one size to one company. The general Vehicle Company, Long Island City, which is making aeroplane motors, bought some additional machines in the week.

Teknisk Kompani, Dronningensgt. 14 Christiania, Norway, is seeking two pneumatic locomotives, to draw six cars with a total load of twelve tons. The locomotives must operate in an atmospheric pressure that is seven atmospheric over-pressure, and have a speed from ten to twelve km. per hour. The track gauge is 600 mm. The grade varies from level track with full load to  $3\frac{1}{2}$  per cent light load. The transport length is 1200 m. On account of difficult transportation, shipment must be made in parts not exceeding one ton. Delivery must be made before January 1 next. Tenders call for a liberal list of spare parts to accompany quotation, with prices. Detailed description of the locomotives and the work charges such as energy consumption should be stated in cu. m. per work hr. at the specified air pressure. It is also in the market for a vertical steam engine of 18 to 20-hp., to work at 80-lb. steam pressure and 250 r.p.m., to be delivered with regulator, bedplate planed, and with three axletaps without coupling. A dimensioned blue-print should accompany proposals.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 27, schedule 8552, for five spur-gear chain hoists for Philadelphia, and four hydraulic jacks for Boston; until August 17, schedule 8559, for one two-speed 24-in. bench drill, one double emery grinder, and one screw-cutting engine lathe, all for Mare Island; schedule 8560, one universal bench saw, for Puget Sound.

P. A. von Mohrenschildt, representing the largest oil production company in Russia, is in the market for a complete plant for manufacturing steel and iron barrels. Capacity of plant 15,000 to 20,000 bbl. a year. Capacity of barrel 400 to 500 lb. Proposals with detailed drawings, estimate prices, etc., must be sent to his office 239 West Thirty-ninth Street (14th floor), New York.

James B. Crowell & Son, manufacturers of brick molds, harrows, etc., Wallkill, N. Y., whose entire plant was destroyed by fire June 24, is preparing to rebuild. They will be in the market for a complete machine equipment as soon as the building is erected. Planing machines, saw tables, mortise machines, jointer's drill press, sawmill, small boilers, planing machines, arbers, etc., will be required.

E. D. & A. F. Cronk, Inc., will erect an addition to its repair shops at 66 Hotel Street, Utica, N. Y., of brick, 90 x 100 ft., to cost about \$9,000.

Port Washington, Long Island, N. Y., has approved an issue of \$125,000 of sewer bonds.

The Tension Supply Company, 1509 Hudson Terminal, New York City, has been incorporated with a capital stock of \$25,000 to manufacture mill supplies. Edward W. Becher, Newark, N. J., Claude H. Rivers and Henry Hopkinson, Elizabeth, N. J., are the incorporators. The company has established a factory at 168 Emmett Street, Newark, N. J.

The Burns Wagon Rack Company, 390 Hayward Avenue, Rochester, N. Y., has been incorporated with a capital stock of \$40,000 by Samuel J. Sayers and others. William H. Burns is president; Orrin Simmons, vice-president, and Mr. Sayers is secretary and treasurer. The company will receive bids for the construction of their rack July 8, and plan to establish an office near the plant of the successful bidder.

The Stewart Engineering Corporation, 17 Battery Place, New York City, has received general contract for constructing a dam at Felts Mills, N. Y., for generating power to operate the pulp and paper mill of the Taggart Paper Company.

New York, N. Y., will receive bids until 2 p. m. July 12 for altering and improving the New Utrecht pumping station and converting it into a distribution station. William Williams is commissioner of water supply.

The Sanquoit Toilet Paper Company, New Hartford, N. Y., is taking bids for a plant consisting of two 3-story buildings, 141 x 143 ft., and 58 x 194 ft., to cost \$100,000. John Ross, New Hartford, is secretary and treasurer.

The Fifth Carpet Company, Auburn, N. Y., has let contract for an addition 105 x 150 ft., one story, to its plant.

Contract has been let for erection of a one-story boiler house 120 x 150 ft., to be added to the plant of the Savage Arms Company, Utica, N. Y.

The four-story addition to the automobile plant of the H. H. Franklin Mfg. Company, Syracuse, N. Y., will be 153 x 160 ft.

The Brunner Mfg. Company, of which Leo Brunner is president, has let general contract for erection of a one-story machine shop, 77 x 180 ft., with annex, 49 x 49 ft.

The Bonney Vise & Tool Works, Inc., Allentown, Pa., has nearly completed a one-story forge building, of brick and concrete, 50 x 153 ft., and is installing hammers, presses, etc. It is being erected at Meadow and Tilghman Streets, and in addition to its present machine and forge shops.

## Philadelphia

PHILADELPHIA, Pa., July 5, 1915.

The new shrapnel factory of the Harrisburg Pipe & Pipe Bending Company was placed into operation Wednesday with 132 new lathes running. Five hundred additional men are employed. This company is also very busy making high-pressure gas tanks to fill orders obtained since the foreign supply has been shut off.

The American Feeding Products Company, Tasker and Vandalla Streets, Philadelphia, has awarded contract to Steward & Stevens, 1716 North Ninth Street, for the construction of a one-story frame and iron engine room 50 x 52 ft. to cost about \$1,500.

The Standard Steel Works Company, Burnham, Pa., has orders to keep it busy for six months. Many locomotive tires are being shipped to European countries.

The York Machine & Supply Company, York, Pa., has moved into the building formerly occupied by the Flinchback Mfg. Company, South Penn Street.

The Hazleton Bleach Works, Hazleton, Pa., has had plans drawn for a one-story brick and concrete factory, 42 x 119 ft. W. E. S. Dyer, Land Title Building, Philadelphia, is the architect.

The Adams County Preserving & Canning Company, York Springs, Pa., is reported to be in the market for new canning machinery.

The National Service Corporation, Hummelstown, Pa., has purchased a canning factory and will convert it into a manufactory for automobile supplies.

The Myers Machine Tool Company, Columbia, Pa., is reported to have obtained an order for its entire output from an English concern.

Martin A. Foster & Son, 707 Eighth Avenue, Altoona, Pa., have erected a foundry for the manufacture of plumbing specialties at an estimated cost of \$5,000. The contract for the equipment has been placed.

Lebanon, Pa., has approved specifications for the sewage disposal plant for a population of 10,000.

## Baltimore

BALTIMORE, Md., July 5, 1915.

The National Enameling & Stamping Company, 1901 Light Street, Baltimore, of which William H. Matthal is manager, has received an order for 20,000 gross of steel knives and forks to be delivered in London. It is said that the company expects more similar orders.

A civil engineering building to cost about \$150,000 will be constructed as one of the structures of the Johns Hopkins University, Baltimore. Joseph Evans Sperry, Calvert Building, Baltimore, is drawing the plans. A mechanical and electrical engineering building and a power plant have been built.

The Eastern Railway Signal Company, Elkton, Md., has been incorporated with a capital stock of \$100,000 by Clement M. Egner, Elkton, and others.

The Baltimore, Chesapeake & Atlantic Railway Company car shops at Salisbury, Md., were destroyed by fire June 26 with a loss of about \$15,000.

The Octagon Insulation & Ceramic Company, Northeast, Md., has been incorporated with \$50,000 capital stock to manufacture iron, brass, bricks, plaster, lime, clays, etc. The incorporators are George Simcoe, Albert E. Smith, Washington Holt and W. H. Simcoe.

The Public Service Commission of Maryland has ordered the Easton Light & Fuel Company, Easton, Md., to install additional equipment.

The H. B. Davis Company, paint manufacturer, 408 Keyser Building, Baltimore, has acquired the plant formerly used by the Chesapeake Iron Works, Bayard and Bush streets, Baltimore. The addition will enable it to more than double its output.

The Stockton Electric Light Company, Stockton, Md., has been incorporated with a capital stock of \$5,000. Alfred C. Hancock, Stockton, is president.

The Schall-Crouch Auto Company, 1919 North Charles Street, Baltimore, plans to establish a fully-equipped garage at a cost of about \$20,000.

The Beam Motor Company, Baltimore, has been incorporated with \$10,000 capital by Allen W. Beam, Jr., Allen W. Beam and William Edgar Byrd.

H. D. Brinzer, Richmond, Va., is considering the construction of a factory for the manufacture of furniture and scythes.



Frederick H. Lord, Belle Haven, Va., is seeking data and prices on machinery for welding broken castings.

Clayton, Del., is to build a water and sewerage plant at a cost of \$20,000.

The Anti-Carboline Oil Company, Norfolk, Va., has been incorporated with a capital stock of \$150,000. Ralph Benton, Norfolk, is president, and Joseph G. Lancaster, Norfolk, secretary and treasurer.

The Roanoke Iron & Bridge Works, Roanoke, Va., has recently purchased the plant of the Roanoke Bridge Company. The business will be known hereafter as the Roanoke Iron & Bridge Works, Roanoke, Va. It is reported that the company in carrying out these changes reduced its capital stock from \$100,000 to \$85,000.

Joseph H. Sneeringer will construct a one-story, fully equipped garage at 1411 and 1413 Milton avenue, 43 x 114 ft., to cost \$3000. A garage, 36 x 105 ft., will be built at 218 Bolton street, by John T. Buckley.

The Norton Coal Company, Norton, Va., will rebuild its power house which was recently burned with a loss of about \$25,000.

A new industry is to be started at Curtis Bay, Md. A large tract of land is being improved and some machinery is being received although the identity of the company is withheld. Rumor has it that the plant will be built for the Du Pont de Nemours Powder Company, Wilmington, Del., to insure a future supply of denatured alcohol, etc.

## Chicago

CHICAGO, ILL., July 5, 1915.

A substantial broadening in the number and variety of machine-tool sales to regular customers has been a feature of this market. Buying for domestic needs shows considerable expansion. Both the Santa Fe and the Burlington railroads have placed orders for a large part of the tools for which they have been in the market, the Burlington still having a number of machines to purchase. While deliveries of lathes in particular are not at all favorable, the situation with respect to other types of tools is much better and the interests of regular customers are being protected as far as possible. The exceptional activity of forge shops and additions to their capacity have brought an unusual number of orders into the market for steam hammers and power and board drop hammers, as well as hydraulic presses and bulldozers. Interesting sales of wood-working machinery are also noted. The Four Wheel Drive Auto Company, concerning whose plant additions notice has been previously published, has purchased a lot of both light and heavy duty lathes and turret lathes. This company has increased its capacity to about 125 three and five-ton trucks a month. Machine-tool prices have now been advanced to decidedly satisfactory figures from the standpoint of dealers who have been subsisting on meager profits for a long period.

The Abbott Auto Sheet Metal Company, Chicago, of which the incorporators are Abraham Reiman, Morris Ring, and Harry H. Levy, has been organized with a capital of \$2,500. It may be addressed in care of Abraham Reiman, 4418 Langley Avenue.

The Imperial Vacuum Heating Company, Chicago, has been organized with a capital of \$30,000 by Burton U. Hills, 37 West VanBuren Street, William H. Beall and William V. Riffe.

The A. Finkl & Sons Company, 2000 Kingsbury Street, Chicago, operating a forge shop, has acquired a tract of land adjoining its works, upon which extensions are to be built.

The Peerless Engineering Company, Chicago, organized by H. S. Stannard, John H. Struve, 7127 Crandon avenue, and Albert O. Olson has been formed with a capital of \$2500.

The Northwestern Metal Spinning & Brass Mfg. Company, Chicago, incorporated with a capital of \$2,500, has been organized by William Glowacki, 1746 Lull Place, Alexander Korwel and George H. Mallin.

McDonald & Son, St. Charles, Ill., have secured contracts for the manufacture of additional products which will considerably increase their operations.

The American McKenna Process Company, Jackson Street, Joliet, Ill., is planning to resume operation of its mill.

The Fort Dearborn Mfg. Company, machinist, 1574 Crossing Street, Chicago, has bought the shop formerly occupied by Lawrence Brothers, at Rock Falls, Ill., and is about to move its plant to that location, where larger facilities are available for its growth.

F. N. Wilson, 331 West Thirty-fifth Street, Chicago, is in the market for a second-hand hoisting engine of approximately 30 hp., equipped with double-drum hoists.

Chicago Heights, Ill., will receive bids until 10 a. m., July 19 for a deep well centrifugal pump. Orin W. Ritter is city clerk.

The DeSmet Quartz Tile Company, Area, Ill., has been incorporated with a capital stock of \$35,000 by Clarence C. Green, S. L. Tripp, and Howard L. Fisher to manufacture cement tile and blocks. Elbert C. Ferguson, Room 1450, 10 South LaSalle Street, Chicago, is in charge.

The Newton Ice & Cold Storage, Newton, Ill., has been incorporated with a capital stock of \$25,000 by Fred Elder, E. W. Hersh and F. H. Robertson.

The Murphysboro Waterworks Company, Murphysboro, Ill., has placed the contract providing for the construction of a filtration plant.

The Iowa Malleable Iron Company, Fairchild, Iowa, has completed plans for the erection of an additional one-story building, 50 x 100 ft.

Wilton, Iowa, is considering the installation of additional generating machinery. David G. Fisher & Co., Davenport, Iowa, are the engineers.

Hastings, Neb., will shortly install an additional 750-kw turbo generator with jet condenser. W. J. Watson is commissioner.

J. P. Raymond and Fred S. Raymond have completed arrangements for starting up a gray-iron foundry at Bemidji, Minn.

## Milwaukee

MILWAUKEE, WIS., July 5, 1915.

Improvement in the metal trades continues to be slow. On account of the holiday few of the shops are working to-day, and only enough men are kept on the job to insure the output of imperative specifications. The decrease in value of new construction in Milwaukee shows a loss for June, but the month's figures are not much below those of the corresponding month a year ago. Banking business shows growth and collections generally are reported slightly better. The first half is claimed to have been practically the equal of the first six months of last year. War business, while helping to swell the total, is not the most important factor.

A shortage of skilled mechanical labor is being felt by numerous metal-working industries in the interior of Wisconsin. The Kissel Motor Car Company, Hartford, Wis., is advertising in the metropolitan press for experienced machinists for milling machines, universal grinders and drill presses. All around machinists are being given preference in employment.

Wallace Fields, DePere, Wis., will organize a company to manufacture and market a machine for the manufacture of key-calks for horseshoes; but for the present he will contract for its manufacture with the Green Bay Barker Company, Green Bay, Wis.

The Northwestern Storage Battery Company, Chicago, Ill., is negotiating for a location in Wisconsin and proposes to move its plant this year.

It is reported that the plant of the Portage Electric Light & Power Company, Portage, Wis., was sold on July 1 to Woodmansee & Davidson, Chicago. The price is said to be \$145,000. The new owners control three other plants.

The Marine Appliances Company has been organized at Superior, Wis., to manufacture marine devices, compasses, signals, etc. The promoters include G. A. Tomlinson, M. B. Benson, D. W. Stockwell, and R. J. Close, Duluth, Minn., and J. H. Cooke, Superior.

The Daniels Mfg. Company, Rhineland, Wis., has been organized by J. S., A. D., and E. S. Daniels to engage in the paper and paper mill supply business. The capital stock is \$10,000.

The Walker-Moore Mfg. Company, 330 Wisconsin Street, Racine, Wis., manufacturing automobile parts, has changed its corporate name to Walker Mfg. Company. W. A. Walker is president and W. T. Walker secretary and treasurer.

The Wisconsin-Minnesota Light & Power Company, LaCrosse, Wis., a consolidation of public utilities in the upper Mississippi Valley, is preparing to spend about \$210,000 in improving the power and central heating system at LaCrosse.

The directors of the Wisconsin Telephone Company, Milwaukee, authorized expenditures amounting to \$514,000 for new construction and repairs in Wisconsin in 1915. H. C. Seymour is general manager.

The J. B. D. Resilient Wheel Mfg. Company, 671 Smith Street, Milwaukee, has increased its capital stock from \$15,000 to \$50,000 in preparation for an extended program of operations. J. B. Demerath is president.

The Ajax Foundry Company, 435 Howell Avenue, Milwaukee, sustained considerable loss by fire resulting from a cracked cupola.

Articles of incorporation have been filed by the LaCrosse Scrap Iron & Metal Company. The capital stock is \$5,000 and the incorporators are M. M. Broad, S. G. and R. D. Jordan.

## Cleveland

CLEVELAND, OHIO, July 6, 1915.

A very good foreign demand for cranes, hoists, and various other lines of general machinery has sprung up and several good export orders have recently been booked in this city, including one for a large steam hoist for shipment to Japan, an order for which was originally placed in Germany. The domestic demand for locomotive cranes has become quite active. In the line of handling equipment a number of inquiries have come from railroads and steel plants for car dumpers for coal and ore. Owing to the increased use of larger cars, the capacity of many of the present car dumpers is inadequate and these will be replaced with new machinery.

In machine-tool lines the demand for lathes for making shells shows no falling off, but the volume of business that is being placed is much less than it would be were makers able to furnish the desired delivery. Some lathe builders are not promising deliveries on some sizes until January and February. Canadian inquiries are plentiful, and among orders for export to Canada booked the past week were two taken by a local dealer for 167 engine lathes, all to be delivered by Oct. 15. Steel foundries are very busy owing to the increased demand for castings from machinery builders.

Sealed bids will be received by the commissioner of purchases and supplies, Cleveland, July 14, for air compressors for the West Side tunnel extension.

The clerk of the Board of Education Cleveland, will receive bids Aug. 2 for a new boiler for the East Technical High School Building.

The Anderson Rolled Gear Company, Cleveland, has increased its capital stock from \$100,000 to \$150,000.

The National Lamp Works of the General Electric Company, Cleveland, is in the market for machinery equipment, including screw machines, drilling machines, and two large planers.

The Wright Wrench & Forging Company, Canton, Ohio, will shortly begin the erection of an addition to its plant. The company is purchasing some additional equipment, including a steam hammer, lathe, and shaper.

The Timken Roller Bearing Company, Canton, is purchasing machinery equipment for its new cold drawing steel plant.

The Toledo Cooker Company, Toledo, Ohio, has awarded a contract for a two-story and basement factory addition, 75 x 185 ft., to be used for the manufacture of aluminum ware, which the company recently added to its line of products.

The Security Metallic Grave Vault Company, Orrville, Ohio, has been incorporated with a capital stock of \$200,000 by D. C. Boyd and others.

The H. & M. Screw Company, Fostoria, Ohio, has changed its name to the Fostoria Screw Company and increased its capital stock from \$20,000 to \$100,000. The increase is due to the consolidation of the H. & M. Company and the Rumel Machine Screw Company, Cleveland, the latter company's plant being removed from Cleveland to Fostoria. The Fostoria Screw Company will occupy new quarters in a building formerly occupied by the Fostoria Glass Specialty Company.

The United States Clay Products Company, Uhrichsville, Ohio, has placed a contract for the erection of a new sewer-pipe plant at Gnadenhutten, Ohio. This will include a three-story main building, 80 x 256 ft., and an annex, 35 x 112 ft.

The Gramm Motor Truck Company, Lima, Ohio, will enlarge its plant by the erection of a new one-story reinforced concrete building, 75 x 327 ft. This company is understood to have recently received a very large order for motor trucks for export.

Charles E. Peck, clerk of the Board of Education, Ash-tahula, Ohio, will receive bids July 29 for a central heating plant to be used for heating several school buildings.

The Gallon Road Machinery Company, Gallon, Ohio, has been incorporated with a capital stock of \$2,000 by C. T. Tillman, J. G. Matz, C. J. Magley, and others.

The Bucyrus Mfg. Company, Bucyrus, Ohio, is a new company that will manufacture farm implements and various metal specialties. M. G. Delaney is at the head of the company.

## Detroit

DETROIT, MICH., July 5, 1915.

Machinery transactions in this market for the month of June aggregate very respectable totals and both merchants and manufacturers report business as having been satisfactory. A trend toward less activity has set in the past few days. No sales of special importance are reported; but a fair amount of miscellaneous buying has been done by the automobile and automobile parts manufacturers. Inquiry is fairly firm and represents quite a wide range of equipment. Wood-working machinery is dull. Second-hand equipment continues in rather brisk demand; but buyers are requiring only machines in first class condition. The foundry situation continues good although some jobbing plants are operating at less capacity.

The Briggs-Detroit Company, Detroit, automobile manufacturer, has been adjudicated a bankrupt and the Detroit Trust Company has been appointed receiver. Assets are estimated at about \$170,000 and known liabilities are listed at \$350,000.

The Bower Roller Bearing Company, Detroit, manufacturer of roller bearings, etc., has increased its capital stock from \$225,000 to \$300,000.

The Federal Motor Truck Company, Detroit, has begun the erection of a one-story brick and steel addition to its plant.

The Hartford Light & Power Company, Hartford, Mich., has received permission to incorporate from the Michigan Railroad Commission and will at once proceed to rehabilitate and enlarge the present electric light plant at Hartford. About \$5,000 will be spent in improvements. S. H. Highland, Chicago, is president of the new company.

The Calhoun Gas Company, Battle Creek, Mich., is planning the expenditure of about \$300,000 for the improvement of its plant. A new gasholder will be erected and some new equipment will be installed.

The Enberg Electrical Company, St. Joseph, Mich., will shortly begin the erection of a new building, 75 x 200 ft., two stories.

John Dunton and J. H. Hawkins, Lake Odessa, Mich., will establish a flooring plant. The factory is now being arranged for and manufacturing is expected to start shortly.

The Hudson Motor Car Company, Detroit, will erect two additions to its factory at Jefferson Avenue, East and Conners streets, of reinforced concrete, two stories, 60 x 180 ft., three stories, 60 x 100 ft., at a total estimated cost of \$40,000. Albert Kahn is the architect.

Ahmeek, Mich., has voted \$17,500 in bonds for pumping station and waterworks improvements.

The Jackson Machine Tool Company, Jackson, Mich., an affiliated interest of the Walcott-Wood Machine Company, has acquired a plant in that city and will manufacture die-sinking machines.

The Bigelow-Cooper Company, Bay City, Mich., has let the contract for its new wood-working plant in that city. The award, covering the wood-working machinery to be installed, has been made to the American Machine Company.

## Indianapolis

INDIANAPOLIS, IND., July 5, 1915.

The Empire Automobile Company, Connersville, Ind., has leased the factory buildings at Indianapolis formerly occupied by the Federal Motors Company and will move its plant to Indianapolis.

Mazo Mfg. Company, Indianapolis, has been incorporated with \$40,000 capital stock to manufacture clay products. The directors are J. Zimmerman, B. Mazo and J. S. Martin.

The Jenney Shock Absorber Company, Indianapolis, has been incorporated with \$15,000 capital stock by G. R. Conner, R. R. Carter and J. Carter to manufacture a shock-absorbing device.

Bids will be received by the Indianapolis Board of School Commissioners, July 16, for an addition to the power plant at the manual training high school.

North Vernon, Ind., is planning to install an additional engine and generator and to remodel its electric light plant at a cost of \$15,000.

Greencastle, Ind., will receive bids until 2 p. m., July 21, for two engines, two 250-hp. boilers, two generators and accessories for the State farm powerhouse. C. E. Talkington is superintendent.

The Hercules Buggy Company, Evansville, Ind., has be-

gun the manufacture of bodies for automobile trucks. J. D. Craft is vice-president and superintendent.

A manual training building is to be added to the high school at Rockville, Ind.

The Indiana Brass Company, Frankfort, Ind., has increased its capital stock from \$10,000 to \$25,000.

The Schroeder Headlight Company, Evansville, Ind., has accepted a rush order for 400 headlights for the Russian Government.

The plant of the Thomas Graham Company, spoke manufacturer, Madison, Ind., was destroyed by fire June 28 with a loss of \$25,000.

Van Buren, Ind., has voted for a waterworks system. It will probably be operated with electricity.

The Komo Mfg. Company, Kokomo, Ind., has been incorporated with \$100,000 capital stock to manufacture ore and other machinery. The directors are O. K., B. D. and Howard Cole.

The Chambers Fireless Cooker Company, Shelbyville, Ind., has bought a former automobile plant and will move into it.

The American Rotary Valve Company, Anderson, Ind., has arranged to manufacture a universal joint for automobiles, and is buying machinery suitable for the manufacture of this product.

## Cincinnati

CINCINNATI, OHIO, July 5, 1915.

The question of being unable to make deliveries at the time wanted has caused many machine-tool builders to refuse business that could be obtained. While no great demand from abroad for machine tools has appeared, as compared with the record four months ago, still the foreign inquiry for lathes and certain types of milling machines has been steady. Quite a number of domestic orders have been received lately; but the majority of them are from manufacturers who are making war munitions. The automobile and auto-truck manufacturers have bought a larger number of machines than is generally supposed, but their orders were placed in a scattering way so that the total is hard to arrive at. The railroads still continue to be disappointing customers, and are only buying for replacement purposes.

With very few exceptions the foundries that are making a specialty of machine-tool castings are operating up to capacity; but the stove foundries are not so fortunately situated. Refrigerating and ice-making machinery is in good demand, although only small equipment is being called for. Portable electric drilling machines are also good sellers and the local plants are all busy.

The Tubular Products & Steel Works, capitalized at \$750,000, has acquired a site at Reading, Ohio, on which it intends to erect a mill for making high-carbon butted steel tubing. Tentative plans for the main building have been made up, and it will be 100 x 300 ft., and of steel construction. Quite a large quantity of machinery will be required, but details as to exact wants are lacking. John K. Ewing, Jr., and I. W. Bollinger, both of Pittsburgh, Pa., are at the head of the new company.

The Cisco Machine Tool Company, Cincinnati, has been incorporated with \$50,000 capital stock by H. C. Busch, James I. Stephenson, James A. Sebastiani, G. M. Horton and J. N. Stallman. The company is closely allied with the Cincinnati Iron & Steel Company, builder of the Cisco lathe. Manufacturing plans have not yet been given out.

M. R. Carpenter, Pickering Building, Cincinnati, refrigerating engineer, has lately received the following contracts for which ice-making machinery will be required: Crystal Ice Company, Marietta, Ohio; National Fire Proofing Company, Haydensville, Ohio, and Becker Brothers, Newport, Ky., all of whom will purchase the equipment needed.

The Cincinnati Traction Company, Winton Place, Cincinnati, will probably build a repair shop.

Hamilton, Ohio, contemplates making some additions to its waterworks plant.

The Mosler Safe Company, Hamilton, Ohio, has taken out a permit for an addition to its power plant, estimated to cost \$2,200.

Contract for the large addition to the plant of the Herring-Hall-Marvin Safe Company, Hamilton, Ohio, has been let to the Cullen & Vaughn Company, Hamilton. Work on the new structure will be commenced at once.

The Safety Electric Rim Company, Middletown, Ohio, recently incorporated by C. H. Murray, and others, has leased the second floor of the Middletown Auto Company's building, and will install machinery for making an automobile specialty.

The Hinkle Mfg. Company, Xenia, Ohio, has been incorporated by D. G. Powers, and others, to manufacture a patented machine for making automobile wheels. Nothing is known as to machinery requirements.

The Xenia Rubber Company, Xenia, Ohio, is making an addition to its plant. Considerable new equipment will be added.

The Bowlus-Hackett Commission Company, Springfield, Ohio, will require equipment for a refrigerating plant now being constructed.

It is reported that W. E. Murbarger, president of the Monarch Spring Company, Indianapolis, Ind., contemplates establishing a plant at Columbus, Ohio.

The Galvan Mfg. Company, Marietta, Ohio, has been incorporated with \$25,000 capital stock, by F. A. Coskey, and others, and has taken over the business of the Conductor Fitting Company. The company manufactures sheet metal specialties, and does not intend enlarging its plant.

## The Central South

LOUISVILLE, KY., July 6, 1915.

Reports from leading machinery manufacturers are encouraging, indicating that the good business which has been manifesting itself is no flash in the pan, but that conditions in this territory are actually and measurably better. Sales have been satisfactory, compared with the volume of business done heretofore, and the outlook is for even larger orders as prospects continue numerous. Boiler manufacturers are doing well, and the call for electrical power equipment is also good. Purchases of special machinery by new companies are being held back in some cases through difficulty in financing operations, but the situation is now more favorable to securing money for work of this sort.

The C. Lee Cook Mfg. Company, Louisville, has received a contract for a large number of 24-in. engine lathes from the Hamilton Machine Tool Company, Hamilton, Ohio, for direct shipment to foreign buyers, and this order, together with the regular business of the company on metallic packing, will necessitate the operation of the plant day and night for several months. No new tools will be required.

The Kentucky Carbonic Company, Louisville, is being organized with \$50,000 capital stock, and plans the establishment of a plant for the manufacture of carbonic acid gas at Thirtieth and Kentucky Streets. Samuel Lebligh, 617 South Second Street, Louisville, is president.

Woodford Shannon, 827 South Fifteenth Street, Louisville, has established a small plant for the manufacture of bed springs, and will organize the Shannon Spring Bed Company with \$30,000 capital stock to make spiral springs, as well as woven-wire and link fabrics. Automatic coilers, cutting machines, etc., will be needed. Motor power will be used.

The J. V. Pilcher Mfg. Company, 709 East Gray Street, Louisville, which manufactures a patented metal button, has completed arrangements for the establishment of a factory at Windsor, Ont. It will be in charge of Thomas P. Archer, who has been superintendent of the Louisville plant.

The Graf Stove & Range Company, Louisville, which has been assembling its goods for some time, plans to establish a foundry shortly for the manufacture of the castings. The company is capitalized with \$100,000 capital stock. H. J. Graf is president.

Luther Humphrey, Cynthiana, Ky., is equipping an automobile garage, for which some machine tools will probably be needed.

The Kentucky Solvay Coke Company, Ashland, Ky., is reported to have plans for the construction of fifty-two additional coke ovens, which will double the capacity of the plant.

J. W. Watters, Lewis Connor and V. D. Presnell, Smithland, Ky., are planning the establishment of an electric light and power plant.

The Nashville Buick Auto Company, Nashville, Tenn., is completing the equipment of a garage at 1231 Broadway. Will Caldwell is manager.

The Jones & Hopkins Mfg. Company and the Smith, Herring & Biard Mfg. Company, Nashville, Tenn., have been consolidated under the name of the latter.

The Chattanooga Stamping & Enameling Company, Chattanooga, Tenn., has completed the erection of its main factory building, and equipment is now being installed. It will begin buying material shortly. William Lipphardt is president.



The Lutz Company, Bowler Company, Houston, Tex., manufacturer of turbine pumps and waterworks equipment, has completed arrangements for locating and consolidating its manufacturing department in Memphis, Tenn. The plant will be located at Chicago and May streets. The factories that are being closed are at Stuttgart, Ark.; Jackson, Miss., and Houston, Tex.

G. N. Shepley, Harriman, Tenn., is equipping a plant for the manufacture of fertilizer from the ashes of hardwood sawmill refuse.

The East Tennessee Packing Company, Knoxville, Tenn., plans to erect an addition to its factory. R. F. Graf & Sons are the architects.

The Iron City Stove & Foundry Company, Knoxville, Tenn., has elected J. Gutman, president; J. C. George, vice-president, and J. B. Baumgartner, secretary and treasurer.

The Finance Committee, Knox County, Knoxville, Tenn., has made an appropriation for a steam-heating plant at the county poor asylum.

The People's Power Company, Shelbyville, Tenn., has been incorporated with \$25,000 by J. E. Huffman, E. C. Huffman, A. M. McGill and others.

The city of Memphis, Tenn., has practically decided to build an electric light and power plant with the proceeds of a bond issue of \$1,500,000.

## Birmingham

BIRMINGHAM, ALA., July 5, 1915.

The really good feature of the machinery trade is a healthy demand for agricultural supplies. Electrical equipment demanded about holds its own, while machine tools and sawmill equipment are without note. Improvement is spasmodic, first in one way and then in another. General conditions are slightly better than several weeks ago.

A. C. Davis, chairman, and other members of a special committee of the Chamber of Commerce, Montgomery, Ala., have advised the organization of a stock company with \$200,000 capital for the building of a meat-packing plant.

Farmers of Pike County, Ala., have subscribed \$20,000 for the establishment of a packing plant. L. J. Hawley, Troy, Ala., is in charge.

It is reported that the Woodward Iron Company will build a benzol plant at its by-product works and utilize the product not taken by the recently established Edison benzol plant.

The Helen Lumber Company, Mobile, recently organized, will operate sawmills.

The City Disinfecting & Refining Company, Atlanta, has been incorporated by Fred E. Hoerta, Atlanta, and W. H. Cox, with a capital stock of \$15,000, to reclaim sewage as fertilizer.

The Farm Products Company, West Point, Ga., will rebuild its burned ginney at a cost of \$10,000. L. C. Fullerton is manager.

The McKay Disc Plow Company, Rome, Ga., has been incorporated with a capital stock of \$6,000 and privilege to increase it to \$200,000. Augusta P. McKay, W. H. Martin, J. B. Sullivan, and H. A. Dean are the incorporators.

The Alco Feed Mills, Atlanta, has been incorporated with a capital stock of \$20,000, by James C. Wilson and W. C. Smith.

The Calhoun Timber Company, Jacksonville, Fla., has been incorporated with a capital stock of \$2,000,000 by Basson Parker and Edward L. Hamilton, Niles, Mich.; Hoyal A. Smith, Bisbee, Ariz.; R. C. Lubens, St. Ansgar, Iowa, and William H. Brown, Jacksonville.

A cold storage department will be installed in the municipal ice plant at Lake City, Fla.

J. H. Hewlett and others have incorporated the Hewlett Cattle Tail Company, Allendale, S. C., with a capital stock of \$10,000.

F. S. Evans, Greenwood, S. C., and associates will establish a four-press cotton-seed oilmill and a fertilizer plant.

## St. Louis

ST. LOUIS, MO., July 5, 1915.

Some slight improvement of the indirect character has been felt in the local machine-tool market the past week, largely due to demand from other territories. The direct inquiry is also a little better. Money is easy, but the investigation of loans is still rather closely conducted. Permanent investment capital is also withheld. Collections are good.

The Arkla Lumber & Mfg. Company, St. Louis, has been incorporated with a capital stock of \$30,000 by Jacob Stiasny,

Henry A. Singer, J. Milton Wells and others, and will equip timber mills.

The New National Oilcloth Company, St. Louis, has been incorporated with a capital stock of \$75,000 by R. N. Stubb, William Oepts, S. C. McCormick, Ben Blewett, C. S. Moody and others, and will rebuild at once its plant recently destroyed by fire.

The J. W. Leigh Motors Company, St. Louis, has been incorporated with a capital stock of \$12,500 by J. W., H. W., and B. B. Leigh.

St. Louis, Mo., will receive bids until noon of July 9 for furnishing and installing two 350-hp. Heine type boilers. E. R. Kinsey is president of the Public Service Board.

The Vernon Packing & Creamery Company, Nevada, Mo., has been incorporated with a capital stock of \$44,000 by F. N. Davis, E. T. Letton, and A. D. Crabtree.

John T. Woodruff, Springfield, Mo., has plans for the equipment of a central lighting and heating plant in the business section of the city.

An electric light plant will be built for the fourth district normal school at Springfield, Mo. John J. Schneider is president.

The Tarkio Electric & Water Company, Tarkio, Mo., will install a plant for public service to cover a radius of about eight miles.

The St. Joseph Refining Company, St. Joseph, Mo., with general offices at Cushing, Okla., has been incorporated with a capital stock of \$25,000 by W. J. Rowland, W. H. Tippet and others to equip and operate a plant of 350 bbl. daily capacity.

A mill of 500 tons daily capacity and to cost \$40,000 will be equipped on mining property at Webb City, Mo., by J. B. Kassebaum, Pittsburgh, Kan., and others.

The Electric Pure Water Company, Kansas City, Mo., has been incorporated with a capital stock of \$15,000 by H. Clark, John G. Schmerdrinoff and I. E. Sexton, and will install power and electric water purifying equipment.

The St. Joseph Public Elevator Company, St. Joseph, Mo., has been incorporated with a capital stock of \$50,000 by R. E. Hastings, J. S. Frederick and Orestes Mitchell.

The Kansas City Tire & Rubber Company, Kansas City, Mo., has been incorporated with a capital stock of \$2,000,000 by P. E. Werner, Akron, Ohio, and others, and will equip plants at Kansas City and Chester, W. Va., for the manufacture of tires, etc.

The Newburg Automatic Mail Company, Newburg, Mo., has been incorporated with a capital stock of \$100,000 by John A. Chambers, J. A. Porter and A. H. Dowell, and will equip a plant for the manufacture of train mail catching and delivery devices.

The new assembling plant addition of the Ford Motor Company at Kansas City, Mo., will be 125 x 400 ft., three stories.

The Mogul Motor Truck Company, 6100 Maple Avenue, St. Louis, Mo., will equip a plant to cost about \$50,000.

W. Y. Bransford, Lonoke, Ark., will install one 50-kw. single-phase, 60-cycle, direct connected generating unit.

The E. C. Wehrfritz Machinery & Supply Company, Little Rock, Ark., will rebuild and equip its machine shop recently burned with a loss of \$100,000.

A smelter plant will be erected and equipped at Batesville, Ark., by J. C. Thomson of Woodward, Ala., and others interested.

A waterworks plant of 175,000 gal. daily capacity, to cost about \$90,000, will be installed at Benton, Ark., by the Improvement District Commission, of which George T. Hughes is chairman.

A wood-working plant for the manufacture of store fixtures, refrigerators and similar equipment will be installed at Texarkana, Ark., by R. R. Clough, J. R. Jones and M. Reinholdt of Fort Smith, Ark.

Boswell, Okla., will expend about \$14,000 on electric light plant equipment. The engineer in charge is J. T. George, Ada, Okla.

Chandler, Okla., will expend about \$5,000 on additional equipment for its waterworks pumping station.

A plant for the manufacture of boxes, baskets, etc., will be equipped at Ardmore, Okla., by Earl Allen, Durant, Okla.

J. Rounds, Moss Point, Miss., is in the market for machinery for the manufacture of buttons.

The Tallahatchie Co-operative Warehouse Company, Charleston, Miss., will equip a six-stand gin.

Clarksdale, Miss., will expend about \$150,000 on the enlargement of its electric light and power plant.

Kosciusko, Miss., will equip an electric light plant and waterworks and will require additional equipment to cost about \$30,000.

The Brown Lumber Company, Hiwanne, Miss., will rebuild its lumber plant and planing mill recently burned with a loss of \$50,000.

A sawmill of large capacity will be equipped at Scott, Miss., by G. M. Flynn, Columbus, Miss.; D. K. Jeffries, Chicago, Ill., and others.

A bleachery will be equipped at Meridian, Miss., by T. L. Wainwright, Stonewall, Miss., C. L. Gray, J. G. Daly and J. M. Guthrie, Meridian, at a cost of about \$35,000.

An ice plant of ten tons daily capacity will be equipped at St. Martinville, La., by Edward Bulliard.

Bogalusa, La., will expend about \$200,000 acquiring existing waterworks and adding new machinery.

S. G. Patterson, Bogalusa, La., will install an irrigation system near Bogalusa.

#### Catalogs Wanted

The Orr Modern Motors Company, Yazoo City, Miss., desires to secure catalogs, prices, etc., from manufacturers of automobile motors, frames, springs, electrical equipment, metals, axles, differentials and accessories, and will receive proposals for the manufacture of special machinery for this kind of work. C. D. Orr is secretary.

## Texas

AUSTIN, TEX., July 3, 1915.

The demand for oil-well drilling machinery and equipment has slackened, but in other lines of machinery sales have increased. The creating of drainage districts in the Gulf Coast region also brings with it a demand for dredging machinery. Many farmers are planning to install irrigation pumping plants. Crop conditions are excellent.

The Improved Farm Implement Company, Dallas, has been organized with a capital stock of \$100,000. H. M. Gardner is a stockholder.

Work will soon be started on improvements to the municipal electric light and waterworks plants at Seguin, to cost \$20,000.

The Rosebud Compress Company, Rosebud, has increased its capital stock from \$20,000 to \$40,000, and will make improvements to its plant.

The Lacquer-All Company, Dallas, is being organized with a capital stock of \$50,000 to build and operate a varnish plant. J. Edgar Finley is one of the organizers.

H. H. Sigman & Co., who recently leased the grain elevator and mill of the Brownwood Mill & Elevator Company, Brownwood, are preparing to install electric motors and other equipment.

Benjamin Curtis, El Paso, plans to build a plant for manufacturing hollow tile for silos.

The Farmers' Gin Company, Weston, will build a cotton gin to cost \$10,000. J. S. Collins is in charge.

The Dallas Union Terminal Company, Dallas, will build an electric light, power and heating plant for supplying the new union station and terminals at Dallas now under construction. The proposed plant will cost about \$60,000.

The Farmers' Gin Company, Stamford, will build a cotton gin to cost \$10,000.

Cormany Brothers, Moody, will rebuild the waterworks plant and ice factory recently destroyed by fire. A 56,500-gal. steel water tower will be erected.

Marlin, Tex., has voted \$25,000 of sewage bonds, and \$15,000 of waterworks improvement bonds.

## San Francisco

SAN FRANCISCO, CAL., June 29, 1915.

The machine-tool business is dull, and the situation is rendered more unsatisfactory by difficulty in filling such orders as appear. The advance in prices on new tools has tended to turn purchases to second-hand tools, which can be used by most of the small shops, or to retard them indefinitely. General shop and foundry trade shows very little life. A few large plants are proceeding slowly to carry out plans for improvement; but little disposition is shown to expand, most buying being done by small shops.

Mill and logging machinery still finds less than normal demand; but continued activity in the mining districts gives some encouragement. Numerous small gas, waterworks and electric lighting installations are contemplated. The demand for implements and traction engines is well sustained, and increasing interest is taken in pumps and irrigation specialties. Inquiry for grain and feed mill equipment is in good volume.

The Union Iron Works is completing a new system of marine ways, for which three 20-ton locomotive cranes, built by the Link-Belt Company, Chicago, have just been installed to replace the traveling crane system for handling materials in shipbuilding. The cranes are equipped with 50-ft. booms, and are operated on trestles 50 ft. above the base of the ways, with a 500-ft. runway, serving four ways.

The Bean Spray Pump Company, San Jose, Cal., has plans about completed for the reconstruction of its plant, recently destroyed by fire.

The board of education, Stockton, Cal., will take bids July 7 for manual training equipment, including an engine lathe, drill press, several forges and some wood-working equipment.

Ericson & Patterson, South San Francisco, are building a machine and general repair shop near the Pacific Coast Steel Company's plant.

W. H. Packard, Colusa, Cal., and others, plan to build a ricemill at an estimated cost of \$40,000.

The Marchant Calculating Machine Company, Oakland, Cal., has completed plans for a new plant in Emeryville.

The Shell Company has let a contract for the construction of a new machine shop building at its refinery near Martinez, Cal.

The California Rex Spray Company, Benicia, Cal., is adding equipment to its chemical plant.

The Yuba Construction Company, Marysville, Cal., is about to start work on a new gold dredge for the Yuba Consolidated Goldfields.

Los Angeles, Cal., will take bids July 6 for pumping machinery, etc., for the sewage disposal plant at Wilmington.

The Tri-State Irrigation Supply Company, Deming, N. M., has been organized by W. G. Dorff, J. A. Turney, and Thomas McCarty, to deal in well and irrigation machinery, windmills, etc.

The cooperage plant of A. Lorentz & Son, San Jose, Cal., was damaged by fire with a loss of \$5,000.

## The Pacific Northwest

SEATTLE, WASH., June 29, 1915.

The lumber situation continues encouraging. A number of good-sized orders for mining timber have been placed lately. The Kettle Valley Railway Company, Vancouver, B. C., will shortly place an order for 13,000,000 ft. of lumber for snowsheds. Most of the big mills are now operating.

The facilities for export shipping are still wholly inadequate, although ship brokers are scouring the coast for available craft. Practically all of the warehouses are partly filled with shipments awaiting transportation.

W. R. Grace & Co., through their Seattle office, managed by C. M. Pettibone, will shortly receive bids from Pacific Coast shipbuilding yards for the construction of a steamship to cost about \$800,000.

The Alaska trade is increasing rapidly, and the number of shipments of machinery and supplies to that section are greater than ever before. The canneries are expected to do a record business this year.

The Western Box Company, Spokane, has been formed by J. C. Barline and W. B. Hill. The company is erecting a factory at Spirit Lake, Idaho.

The Universal Automatic Wrench Company, Seattle, has been incorporated by L. G. Gliewe, R. L. Gallagher and others with a capital stock of \$50,000.

The Conway Dredging Company, Ruby, Mont., will replace its repair shop and machinery recently destroyed by fire. It is understood that machinery valued at \$10,000 was destroyed. Charles Kammerer, Butte, Mont., is manager.

The Prairie City Light Company, Prairie City, Ore., will begin construction within thirty days on an electric light and power plant of 800 hp., to cost about \$50,000.

Roundup, Mont., will soon issue a call for bids for a 150-hp. steam boiler and compound duplex lamp for its waterworks.

The White Pine Mill Company, Klamath Falls, Ore., has been incorporated with a capital stock of \$10,000 by J. C. Rutenic, Frank D. Miles, and J. F. C. Goeller. It is understood the company plans to construct a sawmill near Klamath Falls.

The salmon canning plant of the Alaska Fishermen's Packing Company, Bristol Bay, Alaska, was totally destroyed by fire. The plant had recently been equipped with new machinery, giving it a valuation of \$75,000. The plant was largely owned by the Libby, McNeill & Libby interests, and was managed by A. S. Graham.

Construction work has been started by the Inland Empire Paper Company, Spokane, Wash., on its new sulphide plant at Millwood, at cost \$200,000. The new plant will produce raw materials now imported. Judson G. Rosebush, Appleton, Wis., president, and L. M. Alexander, Port Edwards, Wis., is manager.

The Grand Ronde Lumber Company, Perry, Ore., has increased its capital stock from \$650,000 to \$1,000,000 to provide for improvement work on its properties.

The machine shops of the Courey Gold Mining Company, Meridian, Mont., were burned recently, with complete destruction of all the machinery, with an estimated loss of \$5,000 to \$100,000. It is stated that the company will soon rebuild.

W. J. Longston, Coquille, Ore., announces that he has planned the construction of a brick factory to cost about \$25,000.

The Moore mill property in Klamath Falls has been purchased by the Klamath Mfg. Company, Klamath Falls, of which R. A. Johnson is manager. The company plans to move it to Shippington, Ore., where it will be used as part of the new plant being constructed at that place.

Bids for a one-story building, 90 x 150 ft., to be built by the Broderick & Bascom Rope Company, Seattle, Wash., are now being received by Stephen & Stephen, architects, New York Building, Seattle. The building will be an addition to the present plant.

The Port Commission, Portland, Ore., is now receiving bids for installation of ladder, cutting machinery and other equipment for the new dredge Columbia. The machinery is estimated to cost \$22,500.

## Canada

TORONTO, ONT., July 3, 1915.

The McFarlane-Pratt-Hanley, Ltd., 43 Scott Street, Toronto, Ont., is in the market for an upright boiler of 40 hp., 16 ft. grate surface, 500 sq. ft. heating surface, to carry 100 to 110 lb. pressure.

The Aetna Explosives Company, 2 Rector Street, New York, will establish a plant at Sydney, N. S. The company has recently granted letters patent at Ottawa. A. J. Moxham is president.

Fire did damage to the extent of \$9,000 to the planing mill of Thomas Roussel & Son, Nightingale Street, Hamilton, Ont. The loss is mostly to machinery.

The Truro Engineering Works, Truro, N. S., will install \$25,000 worth of new machinery in its plant for the manufacture of shells.

A shell factory to cost \$8,000 will be built at Oshawa, Ont. Those interested in the undertaking are Ernest L. Crabtree, William J. McCallum and John Ritchie.

The Hydro Electric Commission will install new hydraulic machinery at Springbank Park, London, Ont., to be used for pumping water and developing 350 hp. for peak load correction. E. V. Buchanan is manager.

The Creditvale Works, Ltd., Toronto, Ont., has been incorporated with a capital stock of \$100,000 to manufacture machinery, accessories, etc. The provisional directors are Harvey Obee, room 710, C. P. R. Building, Toronto; Archie Cochrane, Kenneth Campbell and others.

The Nitrogen Products, Ltd., Toronto, Ont., with a capital stock of \$300,000 has been incorporated by William J. L. McKay, 466 Marion Street; James E. Patterson, 39 Elgin Avenue; James A. Harris and others of Toronto, to manufacture nitrogen, nitric acid, etc.

The Lachine Mfg. Company, Ltd., Lachine, Que., has been incorporated with a capital stock of \$120,000 by Joseph A. Desarries, Rodolphe LePailleur and others of Lachine, to manufacture iron, steel, metals, etc.

The Keyes Supply Company, Ltd., Ottawa, Ont., has been incorporated with a capital stock of \$15,000 by Albert T. Loveday, John Bain, Corlis G. Keyes and others of Ottawa, Ont., to manufacture machinery, electrical supplies, etc.

R. C. Bustard, room 146, Confederation Life Building, Toronto, Ont., will build a factory on Vine Street.

A furniture factory is being erected at Goderich, Ont., for J. E. Raechler, Goderich Lumber & Milling Company, who is in the market for wood-working machinery.

The American Fire Extinguisher Company, Toronto, Ont., will build a factory 50 x 100 ft., at the corner of Weston Road and Westport Avenue.

The Canadian Paper Sales Company, Ltd., Toronto, Ont., has been incorporated with a capital stock of \$100,000 to manufacture paper, pulpwood, lumber, ties, laths, shingles,

etc. The incorporators are Frank H. Anson, Victor E. Mitchell, Charles M. Holt and others of Montreal.

The Owl Mfg. Company, Ltd., London, Ont., has been incorporated with a capital stock of \$40,000 to manufacture vending machines, etc. The provisional directors are William S. Laskbrook, Frederick J. Appleton, L. Everingham and others.

A large amount of machinery was totally destroyed by fire at the brickmaking plant of Curtis Brothers, Peterborough, Ont.

The Montreal & Southern Counties Railway Company, will build a substation at Granby, Que. H. R. Safford, Montreal, Que., is chief engineer.

The Swedish Crucible Steel Company, Windsor, Ont., is making some extensions to its plant and will install a new cupola.

Pinneo & Sons, Niagara Falls, Ont., will build a box factory.

C. Brisbois will build a sawmill and pulp mill at Monteith, New Ontario. John Thompson, Peterborough, Ont., is interested in the undertaking.

The Rodney Woodenware Company, Rodney, Ont., whose plant was recently destroyed by fire with a loss of \$6,000, will rebuild at once.

Heburn Brothers, Picton, Ont., will purchase new machinery for the manufacture of shells.

P. H. Naylor, Madoc, Ont., will soon start the construction of a machine shop.

The Canadian Tar Products Company, Montreal, Que., will build a boiler house, condenser house and still.

The J. C. Wilson Company, Glenora, Ont., will purchase new machinery for the manufacture of shells.

The Colwell-Ideal Corporation of Michigan has been granted a license with a capital stock of \$40,000 to manufacture plumbing and heating supplies in Ontario. It has appointed Alexander R. Bartlet, Windsor, Ont., its attorney.

The Scott Paper Company, of Pennsylvania, has been granted a license to manufacture in Ontario. The capital of the company is \$40,000. George A. Howell, 800 Wychwood Park, Toronto, Ont., will be its attorney.

The Lake of the Woods Boat Company, Ltd., has been granted a license with a capital stock of \$80,000, and has appointed William J. Craig, Keewatin, Ont., its attorney. The company will manufacture boats, launches, engines, and other equipment.

The Electrical Illuminating Company of Canada, Ltd., Montreal, Que., has been incorporated by Henry Weiss with a capital stock of \$95,000 to manufacture electricity, light, heat, etc.

The Quebec Engineering Company, Ltd., Quebec, Que., has been incorporated with a capital stock of \$99,000 by C. E. Taschereau.

The Toronto Chemical Company, Ltd., Halifax, N. S., has been incorporated with a capital stock of \$10,000 to manufacture chemicals, etc.

La Have Concrete Company, Ltd., West La Have, N. S., has been incorporated with a capital stock of \$50,000 to manufacture cement, etc.

The Bull Tractor Company of Canada, Ltd., Winnipeg, Man., with a capital stock of \$25,000 has been incorporated by Garnet Coulter, Percy J. Proctor, Thomas L. Tennent and others to manufacture gas tractors and engines, farm and mill machinery, etc.

The Havers Auto Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$10,000.

The Forget Implement Company, Ltd., Forget, Sask., has been incorporated with a capital stock of \$10,000 to manufacture implements, etc.

The Canadian Metal Weather Strip & Specialty Company, Ltd., Saskatoon, Sask., has been incorporated with a capital stock of \$5,000.

The Edmonton Shell Company, Ltd., Edmonton, Alberta, has been incorporated with a capital stock of \$50,000 to manufacture shells, explosives, guns, etc.

Additions will be made to the waterworks plant at Kam-sack, Sask., to cost \$35,000. H. H. Crawford is clerk.

The City Council of Regina, Sask., has ordered additions to the waterworks plant to cost \$44,500. George Beach is city clerk.

The Aberdeen Lumber Company, Ltd., Aberdeen, Sask., has been incorporated with a capital stock of \$30,000 to manufacture lumber, etc.

The two-story brick factory of the Wood Workers Planing Company, Redcliffe, Alberta, owned by the Brittain Plewes Company, Winnipeg, Man., was totally destroyed, with all its machinery, by a cyclone.



## NEW TRADE PUBLICATIONS

**Oilers, Torches, Flexible Shafts, Etc.**—Gem Mfg. Co., 1229 Goebel Street, N. S., Pittsburgh, Pa. Catalog No. 8. Contains illustrations with brief descriptions and specification tables of a line of patented specialties which includes oilers of various sizes and styles, flexible shafting, grinding machines, breast drills, etc. The construction of the oilers is shown and in the case of the flexible shaft a number of drawings serve to illustrate the construction. Suggestions for the use and care of the shaft are also presented. Views of the new plant which was occupied by the company Jan. 1, 1915, are given and a number of tables of useful information are included.

**Steam Engines.**—Fitchburg Steam Engine Company, Fitchburg, Mass. Catalog. Points out the advantages claimed for this engine such as close speed regulation, small clearances, absence of back pressure, elimination of waste steam by leakage, etc. The engine is described at some length, the text being supplemented by engravings of the different parts. Views of the various types of engines are presented and condensed specification tables and some installation views are included.

**Sheet Metal Products.**—American Sheet & Tin Plate Company, Pittsburgh, Pa. Several folders and one booklet. The folders describe Apollo best bloom galvanized sheets and the various uses for which they are adapted and give directions for applying the sheets for roofing and siding. Plans for applying the sheets are given together with useful information for builders and property owners and a table of U. S. standard gages and weights. Illustrations of buildings upon which these sheets have been used for roofing and siding for a number of years are included. The booklet is devoted to copper and its effect upon steel for roofing tin and gives directions for laying flat and standing seam tin roofs and other information. Illustrations are presented showing the various methods employed in the manufacture of copper bearing steel sheets from the digging of the ore to the laying of the sheets on the roof and tables showing the cost of tin for standing seam tin roofing and the approximate weights per square foot of various roofing materials are included.

**Threading Lathes.**—Automatic Machine Company, Bridgeport, Conn. Two pamphlets. The first illustrates the construction of a line of automatic threading lathes with numerous line and halftone engravings. The various sizes of machines are also illustrated with brief tables of specifications. The pamphlet which contains a fictitious dialogue between a milling machine and an automatic threading lathe points out the difference in the methods of making screw threads on the two machines.

**Woodworking Machinery.**—Oliver Machinery Company, Grand Rapids, Mich. Collection of loose leaf circulars. Give illustrations, descriptions and condensed specification tables of a line of woodworking machinery that includes saw benches of various types; band sawing, surfacing, hand planing and jointing and sanding machines and lathes of the standard and gap types. In all of the circulars views of the different attachments that can be supplied and the adjustments that can be made are included.

**Hydraulic Engines.**—Niagara Hydraulic Engine Company, Chester, Pa. Catalog. Illustrates and describes a line of hydraulic engines for supplying water to industrial plants, mining operations and railroad water tanks. These engines are designed to derive their pumping force from the same water that is pumped or to utilize dirty or muddy water for pumping and deliver clean spring water. Brief descriptions of how the two types of engines operate are given together with directions for their installation. A number of views of the engines themselves and of places where they are in use are presented.

**Wood Block Floors.**—Ayer & Lord Tie Company, Railway Exchange Building, Chicago, Ill. Pamphlet. Is a condensed statement of facts of interest to men who design, operate or control manufacturing plants and tells why the company's blocks are superior to all other types of material. The requirements that must be met in the selection of the material for factory floors are pointed out and it is shown how the blocks meet these requirements. A number of illustrations of shops in which this flooring has been installed are included.

**Pipe Threading and Cutting Machinery.**—Merrell Mfg. Company, Toledo, Ohio. Bulletins Nos. 14 to 22, inclusive. Give general descriptions and specifications for a line of pipe threading and cutting-off machines which includes hand and power types, the latter being arranged for either belt, gasoline and steam engine or electric motor drive. The bulletins are all practically uniform in makeup, an engraving of the machine being given on the first page with

the description and specification tables occupying the inside facing ones and a rear view of the machine or part on the fourth page. Mention is also made of the various chucks that are supplied for the portable hand and combination hand and power machines for cutting close and short nips and the countershafts for a belt driven machine.

**Grinding and Pulverizing Machinery.**—Mead & Co., Nineteenth Street and Michigan Central Railroad, Detroit, Mich. Catalog. Devoted to a grinding and pulverizing machine that is made in three sizes for handling practically all kinds of material. The construction of the mill, its adjustment for grinding various substances and installation and operation are described, the text being supplemented by a number of illustrations. A list of the substances that can be ground is included together with a partial list of materials grouped according to the material which the mill handles. A condensed table of specifications completes the catalog.

**Metal Working Machinery.**—Waltham Machine Works, Waltham, Mass. Collection of folders. Cover a line of metal working machinery that includes thread milling and gear cutting machines and a bench lathe. In all of the folders the construction of the machine is gone into at some length with brief statements of the work for which it is adapted and an engraving of the machine is presented.

**Motor Drive for Machine Tools.**—Roth Brothers & Co., Adams and Loomis Streets, Chicago, Ill. Bulletin No. 12. Devoted to the application of direct current electric motors for driving band saw machines. The advantages of using electric motor drive for this tool are briefly discussed. A list of the various motors that can be supplied for this purpose is given and mention is made of the application of electric motors to various other machines.

**Crushing and Grinding Machinery.**—Williams Patent Crusher & Pulverizer Company, 2705 North Broadway, St. Louis, Mo. Pamphlet. Describes a line of crushing and grinding machinery which operates on the hinged hammer principle. The principle of operation is gone into at considerable length and views of the various parts are presented as well as a diagram showing the method of compensating for the wear of the hammers. The different machines that have been built for grinding limestone, coal, shale, clay, vulcanite, etc., are illustrated and briefly described. Suggestions for driving these machines are presented together with a diagram showing the variation that it is possible to secure in the fineness of the output of the machine.

**Hoisting Engines.**—Chase Machine Company, Cleveland, Ohio. Collection of loose leaf circulars. Illustrations and descriptive matter explain briefly the operation and use of a line of hoisting engines of various types. These include double cylinder reversing, docking, winding and hauling engines, steam capstans, dredge winches and steam hoists for all purposes. The descriptions merely bring out the principal points about the engine and give the main dimensions.

**Steam Engines.**—Valley Iron Works, Williamsport, Pa. Bulletin. Mentions a line of engines for supplying power through a belt or direct connection. The construction is gone into at some length, the text being supplemented by a number of engravings of different parts. Views of the several types of engines built are also presented together with dimension diagrams and tables. A skeleton sectional view and a numbered schedule of repair parts are included.

**Tiering Machines and Storage Racks.**—Economy Engineering Company, 415 South Washtenaw Avenue, Chicago, Ill. Booklet No. 26. Contains illustrations of a number of different types of machines for piling material. One of the special features of the machine is the brake that is used to prevent the platform from descending too rapidly or the elevating crank flying off and striking the operator. Specifications of the various machines are presented and mention is made of a line of steel racks for storing barrels, drums, or packages of a similar nature. Practically all of the engravings in the booklet are of actual installations.

**Cast-Iron Pipe.**—Central Foundry Company, 90 West Street, New York City. Pamphlet. Describes and illustrates the difference in the life of wrought pipe and cast-iron soil pipe where they are exposed to the action of acids and gases. A number of views showing the condition of pipe made from these two materials after various periods of service are presented.

**Roller Bearings.**—American Roller Bearing Company, 416 Melwood Avenue, Pittsburgh, Pa. Bulletin No. 1947. Illustrates the design and construction of a roller bearing for use in power transmission appliances. The construction of the bearing, which consists of four principal parts, making a simple and complete unit, is briefly touched upon followed by a short statement of the advantages of this bearing from the standpoints of load capacity, durability, life, economical operation, and ease of installation. A list of the sizes in which these bearings can be supplied and a partial list of the machinery on which the bearings are used complete the bulletin.

